This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

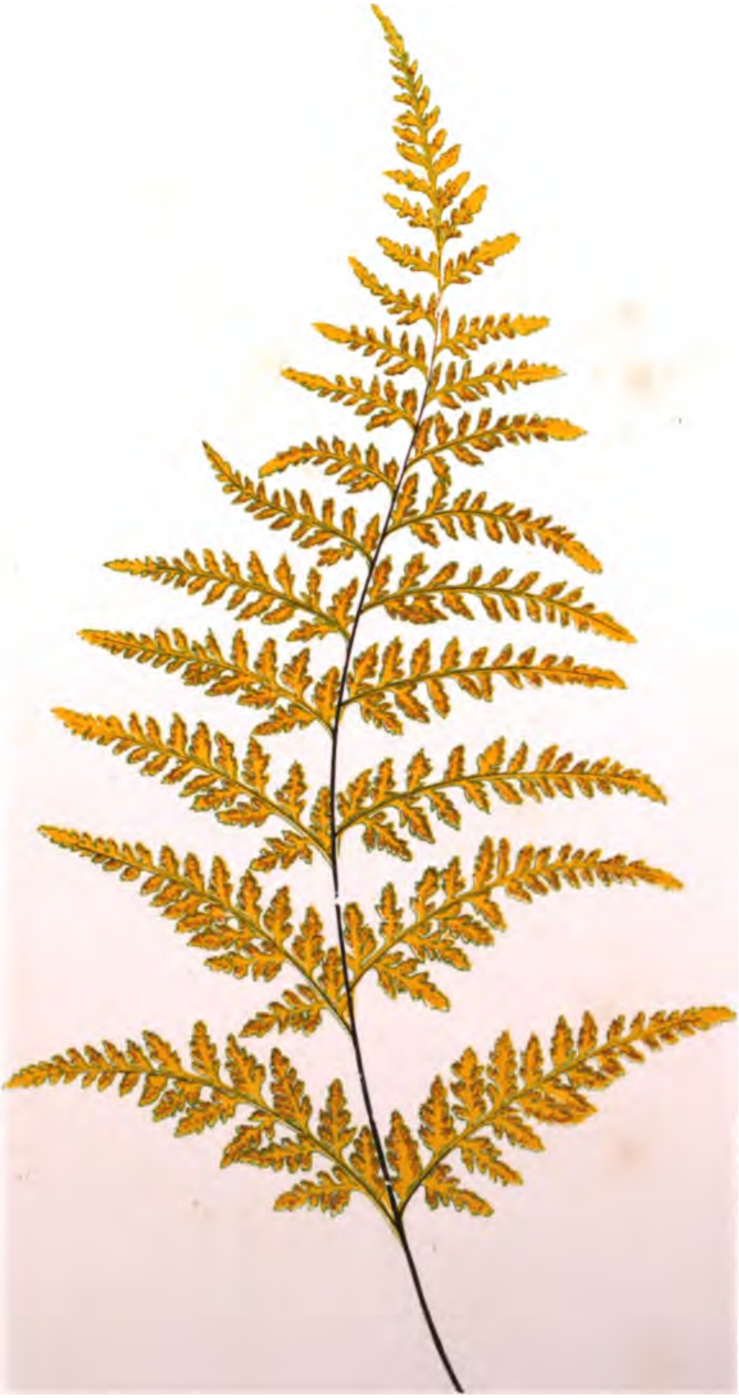
About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

BODLEIAN LIBRARY

The gift of

Miss Emma F. I. Dunston



GYMNOGRAMMA MARTENSII.

I

FERNS:

BRITISH AND EXOTIC.

VOLUME I.

CONTAINING

GYMNOGRAMMA.
NOTHOCHLÆNA.
NIPHOBOLUS.
POLYPODIUM, IN PART.

BY

E. J. LOWE, ESQ., F.R.A.S., F.G.S., F.L.S., F.Z.S., F.M.S.,
Hon. Mem. Dublin Nat. Hist. Soc., Mem. Geolog. Soc., Edin., Corr. Mem. Lyceum
Nat. Hist., New York, Corr. Mem. Manchester Lit. and Phil. Soc., etc.
Author of a "Natural History of British and Exotic Ferns," "British Grasses," etc., etc.

LONDON:
GROOMBRIDGE AND SONS, 5, PATERNOSTER ROW.
M DCCC LXVII.

M6

TO HIS GRACE

HENRY PELHAM-FIENNES-PELHAM-CLINTON, K.G., P.C.,

DUKE OF NEWCASTLE,

LORD-LIEUTENANT OF THE COUNTY OF NOTTINGHAM,

A NOBLEMAN UNIVERSALLY BELOVED

FOR HIS PUBLIC AND PRIVATE WORTH,

THE

"NATURAL HISTORY OF BRITISH AND EXOTIC FERNS"

IS WITH PERMISSION DEDICATED

BY HIS GRACE'S MOST OBEDIENT SERVANT

THE AUTHOR.

CONTENTS OF VOL. I.

	Plate.	Page.
Gymnogramma calomelanos	ii	5
chœrophylla	viii	21
chrysophylla, (see martensii, page 25.)	i	3
leptophylla	vii	17
l' herminieri	ix	23
martensii, (see chrysophylla, page 3.)	x	25
ochracea	iv	9
rufa	vi A	13
sulphurea	v	11
tartarea	iii	7
tomentosa	vi B	15
totta	xii	29
villosa	xi	27
Nothochlæna argentea	xix A	55
lævis	xiv A	35
distans	xix B	57
eckloniana	xvii A	47
lanuginosa	xvi A	43
marantæ	xviii B	51
hookerii	xiii	33
nivea	xix C	59
rufa	xviii A	53
squamosa	xvii B	49
tenera	xv A	39
tomentosa	xv B	41
trichomanoides	xiv B	37
vestita	xvi B	45
Niphobolus lingua	xxii	67
pertusus	xxi	65
rupestris	xx	63
Polypodium alpestre	xxxix	115
Polypodium		
albo-punctatum	xxxvi	107
angustifolium	xlviii	141
asplenioides	xxxiv B	103
billardieri	xlvii	137
catharinæ	xliv	131
crenatum	xxvi B	81
deflexum	xlv	133
diversifolium	xliii	129
dryopteris	xxvii	83
effusum	xxiii	73
fortuni	xlii B	127
fraxinifolium	xxxi	95
grandidens	xl	119
henchmanii	xxx	93
hexagonopterum	xlix	143
incanum	xlviii A	139
irioides	xlii A	125
lachnopodium	xxxiii	99
longipes	xxiv	75
phegopteris	xxix	91
phyllitidis	xxvi A	79
phymatodes	xxv	77
piloselloides	xxxii	97
plumula	xli B	123
robertianum	xxviii	87
sepultum	xxxiv A	101
squamulosum	l	145
subauriculatum	xxxvii	109
tetragonum	xlvi	135
vaccinifolium	xli A	121
venosum	xxxv	105
vulgare	xxxviii	111

INTRODUCTION.

FERNS, or, as they are usually termed, Filices, are the highest division of cryptogamic botany. They are leafy plants, the leaflets, or fronds, rising from a rhizoma, this rhizoma creeping upon, or below, the surface of the ground, or rising upwards into the air.

In the Linnæan system, Ferns are the division *Filices*, of the twenty-fourth class, termed *Cryptogamia*. They are in the second class of "Lindley's Natural System," and are called *Acrogens*, the division being *Filicales*. There are no less than one hundred and ninety-two genera, and two thousand and forty species, about one half of which are now cultivated in Great Britain.

Ferns, by their exquisite beauty, great variety, and singularity of the reproductive organs, deservedly rank high amongst cultivated plants. Among them may be found innumerable diversity of form, size, and habit of growth; they are to be met with in almost all parts of the globe, but most abundantly in the tropical regions. Some species grow to the height of forty or fifty feet, bearing their elegant fronds in the most graceful attitudes, those of the Norfolk Island Tree Fern, the *Dicksonia Antarctica*, frequently measure twenty feet, while on the other hand those of the diminutive *Hymenophyllum Tunbridgense*—a British example, scarcely exceed an inch; others, as the *Lygodium* tribe, twine round the nearest support in fantastic wreaths in every direction. Some varieties owe their chief beauty to the farinose powder covering the under side of the fronds, sometimes of a rich golden hue, in others of a silvery whiteness.

As decorative plants in our hothouses and conservatories, Ferns stand unrivalled. True they do not possess the gorgeous colour, which at one period or other of their growth forms the chief glory of most other plants which we so diligently cultivate; but, notwithstanding this, the evergreen species of Ferns maintain an unfailing interest; young fronds, with their delicate tints are constantly appearing, and more mature ones as they pass through the different stages towards fructification, gain fresh beauty in every change.

An additional argument in their favour is, that in many situations, where other plants could not exist, Ferns will not only grow, but impart a character which can be attained by no other means.

Although Ferns are now so generally cultivated, yet perhaps no class of plants is so little understood. This arises partly from the great difficulty of the subject, for in no other do we find such uncertainty both in classification and names; and partly from the fact that no work exists which, whilst being within the reach of all, shall possess accurate coloured figures of the plants described, without the assistance of which it is almost impossible to detect the minute differences which in many instances form the chief distinction between the species. This desideratum it is the object of the author of the present work to supply, for the valuable works of Sir William Hooker, Bauer, Blume, Bolton, Brown, Dryander, Fée, Willdenow, Sprengel, Greville, Hedwig, Kaulfuss, Kunze, Link, Martens, Galleotti, Moore, Newman, Plumier, Presl, Sadler, Schkuhr, Schott, Suminski, Swartz, Weber, Mohr, Smith, Langsdorff, Fischer, Gaudichaud, Bory, Mirbel, Lindsay, Desvaux, Linnæus, etc., are either too expensive, or do not contain all the information required in the present day.

Although the present work is exclusively confined to the delineation of the Ferns indigenous or introduced into England from other countries, still a few words upon the Ferns of the Ancient World will not prove uninteresting. There are fossil as well as recent Ferns, and of the former species all which now remains of them are their pictures, printed by nature upon stones. Nevertheless in some instances, these monuments are so perfect, that occasionally not only are the veinlets accurately imprinted, but the form of fructification is beautifully shewn.

The great majority of the fossil Ferns are found in the coal measures, and nearly all the species are arborescent, and this last feature is the more remarkable, because in the present day no Tree Ferns grow in Great Britain, clearly illustrating that a very different climate existed in this country then, than we now enjoy. If we turn to the Tropical regions we can still find a parallel, Tree Ferns of great size are there flourishing, consequently it is not improbable in that far-distant period, when Ferns were arborescent in England, that a much warmer temperature, a more humid air, and in short a more tropical climate then existed.

It is perhaps not generally known except to Geologists, that of the Ferns found fossil, none of the species have been found growing in the present age.

Of the fossil Ferns the following classification may be briefly enumerated:—

Pachypteris—Two species: from the oolite formation.
Cyclopteris—Four species in the coal formation, one in the oolite, and one in the transition rocks.
Sphenopteris—Nearly forty species.
Glossopteris—Two species in the coal, one in the lias, and one in the oolite.
Neuropteris—Twenty-four species in the coal, three in the new red sandstone, one in the muschelkalk, and one in the anthracite of Savoy.
Odontopteris—Five species in the coal formation.
Anomopteris—One species in the new red sandstone.
Tæniopteris—Three species in the lias and oolite.
Pecopteris—Sixty species in the coal, ten in the oolite, two in the lias, and one in the beds above the chalk.
Lonchopteris—Two species in the coal formation.
Clathropteris—One species in the lias.
Schizopteris—One species in the coal measure.
Otopteris.
Caulopteris.

Altogether enumerating about one hundred and seventy species, amongst which some of the most beautiful are *Pecopteris adiantoides*, *Lonchopteris Mantelli*, *Tæniopteris vittata*, *Neuropteris Loshii*, *Odontopteris minor*, and *Sphenopteris crenata*.

In conclusion it will be necessary, in as few words as possible, to describe the various terms which will be used from time to time in the delineation of the Ferns; and I cannot do this better than adopt the excellent descriptions given in "Smith's Genera of Ferns:"—

Ferns consist of fronds or leaves, which are produced from a rhizoma; the fronds unfold in a spiral manner, and are traversed by veins. From the under surface of these veins are produced, mostly unilocular, although occasionally multilocular, cases, termed sporangia, which contain the reproductive sporules, or seeds.

The rhizoma is a root-like creeping, or cœspitose caudex, from the base of which root fibres descend, and fronds ascend.

The fronds are very various in form, texture, and dimensions. They are sessile or stipitate, being attached to the rhizoma by a lateral articulation; or they are decurrent, persistent, and terminal, the united bases of which produce the progressing rhizoma.

From the immense number of species, it is not remarkable that so much variation in form and size occurs; being linear-lanceolate to deltoid, and from under an inch to twenty feet in length, and from a simple and entire frond to once or many times pinnate and multifid; each ultimate pinna or segment being similar in its parts to a simple frond. The surface of the fronds have sometimes scattered over them hairs, glands, or membranous scales. Frequently the barren and fruitful fronds differ, the latter being often contracted, and differing in appearance.

The veins of the fronds differ very considerably in different tribes. First, they are produced equally from each side of a midrib, (costa.) Secondly, they radiate from the axis of development, the costa being evanescent. Thirdly, they are developed from one side of an eccentric or unilateral costa. They are either as a simple line, or are once or repeatedly branched dichotomously; or the primary or principal veins are costæform and pinnate. The branches of these principal veins, termed venules, being either simple or branched, and the ends or apices of these venules are either free, and terminate at or within the margin, in which case they are called *direct;* or all their apices are joined together by a continuous anastomosing vein, which runs parallel with, and close to, the margin, when it is termed *transverse marginal;* or, the ends of the venules of each fascicle anastomose with the ends of the proximate fascicle, either angularly or arcuated, and produce on the points where they meet, (or exterior side,) one or more outwardly directed (excurrent,) tertiary veins, (veinlets,) which are either free, terminating in the areoles or margin, or anastomose in the angular junction of the next superior pair of venules; or all the venations are nearly uniform and combined, forming equal or unequal-sided areoles, with all the veins joined together, when they are termed reticulated; or they are irregularly joined, whilst at the same time the areoles have produced from their sides, excurrent or recurrent, simple branched or branchiate, straight or uncinate, free or conniving veins, which terminate in the unequal-sided areoles, and are called compound anastomosing. When the veinlets are superficial and distinct, plane or elevated, they are termed external, but when buried in the frond itself, and then frequently indistinct, internal.

THE REPRODUCTIVE ORGANS.

The sporangiferous receptacle is a thickened point or lengthened portion of the ultimate venules; when it is formed on their apex, it is called terminal; when between their base and apex, medial; when on the point of the forking, axillary; when on the angular crossings, or points of confluence of two or more venules, compital; when a portion of the whole of the disc of the frond is changed in texture, and occupied closely by the sporangia, amorphous. Mostly superficial, sometimes immersed, (internal,) or considerably elevated and then globose or columnar.

The sporangia are globose, oval, or pyriform, transparent unilocular cases, and each is surrounded by an elastic articulated ring, or without a ring, then sometimes oblong, opaque, and multilocular. They are mostly pedicellate, very rarely sessile; are produced in crowded masses termed sori, on each receptacle, very seldom solitary or few; sometimes pilose, and a number frequently abortive and deformed.

The sori are collections of sporangia, and have the same form, position, and dimension as the receptacles, consequently are round, elongated, or amorphous, and are placed on or close to the margin of the frond or segment, (called marginal,) or between the margin and midrib, (intramarginal,) or close to the midrib, (costal;) when elongated, are either oblong or linear, making a continuous or broken line, forming an angle with the midrib or margin, (transverse.) The sori are each furnished with a membranaceous covering, called an indusium, which rises from a receptacle, and is of various forms; or the sori are naked, that is, without an indusium.

The indusium is a plane, or vaulted, or cup-shaped membrane, produced from the receptacle of each sorus, called special, and generally falls off (deciduous,) as it becomes replicate. When produced from the centre of the receptacle, it is central; when on one side, lateral; and when its base is attached all round the base or margin, calyciform. When central it is usually orbicular, with its margin depressed and free all round, or it is inflated. When lateral, it is either reniform, oval, or oblong; and attached by a point or base of one side, or linear, and its whole length fastened on the one side of an elongated receptacle, the other side being free. When calyciform, it is entire and globose; but after a time it opens with an entire or laciniated margin, forming a cup which contains the sporangia. Frequently all the margin or lobules of the frond are changed in texture, forming an accessory indusium, with which the interior lateral attached special indusium more or less connives; united, they form a vertical or reflexed, continuous or urceolate calyciform, or bilabiate marginal cyst, which contains the sporangia, and opens exteriorly. Sometimes the whole of the sori of each segment are inclosed within a universal indusium, which is formed by the revolute margin of fertile contracted fronds.

E. J. LOWE.

Observatory, Beeston, May 15*th.*, 1855.

FERNS;

BRITISH AND EXOTIC.

POLYPODIACEÆ. R. Brown.

This very interesting division of Ferns have the sporangia, which are more or less transparent, of an oval or round form. The sporangia are all unilocular and pedicellate. Sometimes, but very seldom, they are sessile.

The opening of the seed-vessels runs transversely, and the sporangia in the greatest number, are supplied with an elastic ring, which surrounds them vertically, and is articulated, (jointed.) In a few examples, this ring instead of being vertical, is found to be oblique.

TRIBE I.

GYMNOGRAMMA. Desvaux.

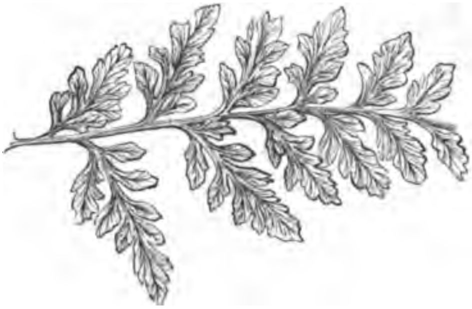
This tribe takes its name from the circumstance that the linear sori are not furnished with an indusium, and are therefore naked. The derivation of the word *Gymnogramma* being from the Greek *gymnos*—naked, and *gramma*—writing.

The veins in the frond are branched, and their apices are free. The length of the frond varies in different species, from a few inches to nearly four feet. The form of the frond is either simple, or pinnate, or bipinnate; or it is decompound. The surface is either smooth, hairy, or it is covered with a farinose powder.

The sporangia, or seed-cases, are medial, that is, they are situated along the veins between the base and the apex, and usually occupy almost the whole length of the venules. The sori are linear, and branched obliquely; after a time they become confluent, and when this occurs, the proper distribution and arrangement of the sori are no longer seen.

Some of the most attractive Ferns in cultivation are included in this tribe, known commonly as the "Gold and Silver Ferns."

The solitary British representative is the *Gymnogramma leptophylla,* and this is only to be found in the Channel Islands. It is a plant very recently added to our country's Ferns. Most of the species are inhabitants of hot climates, requiring the temperature of a moist stove in order to cultivate them successfully.



Portion of mature Frond, upper side.

GYMNOGRAMMA CHRYSOPHYLLA. Kaulfuss. Moore.

See Plate X., (Plate I, G. Martensii.)

Ceropteris chrysophylla,	Link. Fee.
Gymnogramme chrysophylla,	Kunze. Sprengel.
Acrostichum chrysophyllum,	Swartz. Willdenow.
" *aculeatum,*	Desvaux.

Gymnogramma—Naked writing. *Chrysophylla*—Golden-leaved.

Of all the Ferns cultivated in Great Britain, perhaps no species is so universally admired as the *Gymnogramma chrysophylla,* the 'King of the Gold Ferns.' Its graceful habit of growth, added to the farinose powder, covering the whole of the under side of the fronds, and the rich golden appearance of the young stems are attractions of no ordinary character—attractions which cannot fail to strike even the most casual observer, and especially when the plant is in full fructification; for the dark-coloured seed-vessels protrude through this golden covering, and thus heighten the effect produced by this singularly beautiful species.

This exotic Fern is a native of South America and the West Indies; it is found abundantly in the Island of St. Domingo, and in the Caribbee Islands, especially in that of Martinique, and is consequently a stove species: it is evergreen.

The fronds sometimes attain the length of two feet, the upper surface of which is a somewhat pale yellowish green, whilst the under surface is covered with a rich golden yellow powder. The form of the frond is bipinnate, and the pinnæ are lanceolate-acuminate, with roundish ovate pinnules, which are dentate in a slight degree, distant, and pinnatifid. The frond rises out of a fasciculate erect rhizoma, making a dense, compact, golden plant. A third of the frond nearest the base is naked, that is, devoid of pinnæ.

The sori are medial and terminal, and are very conspicuous.

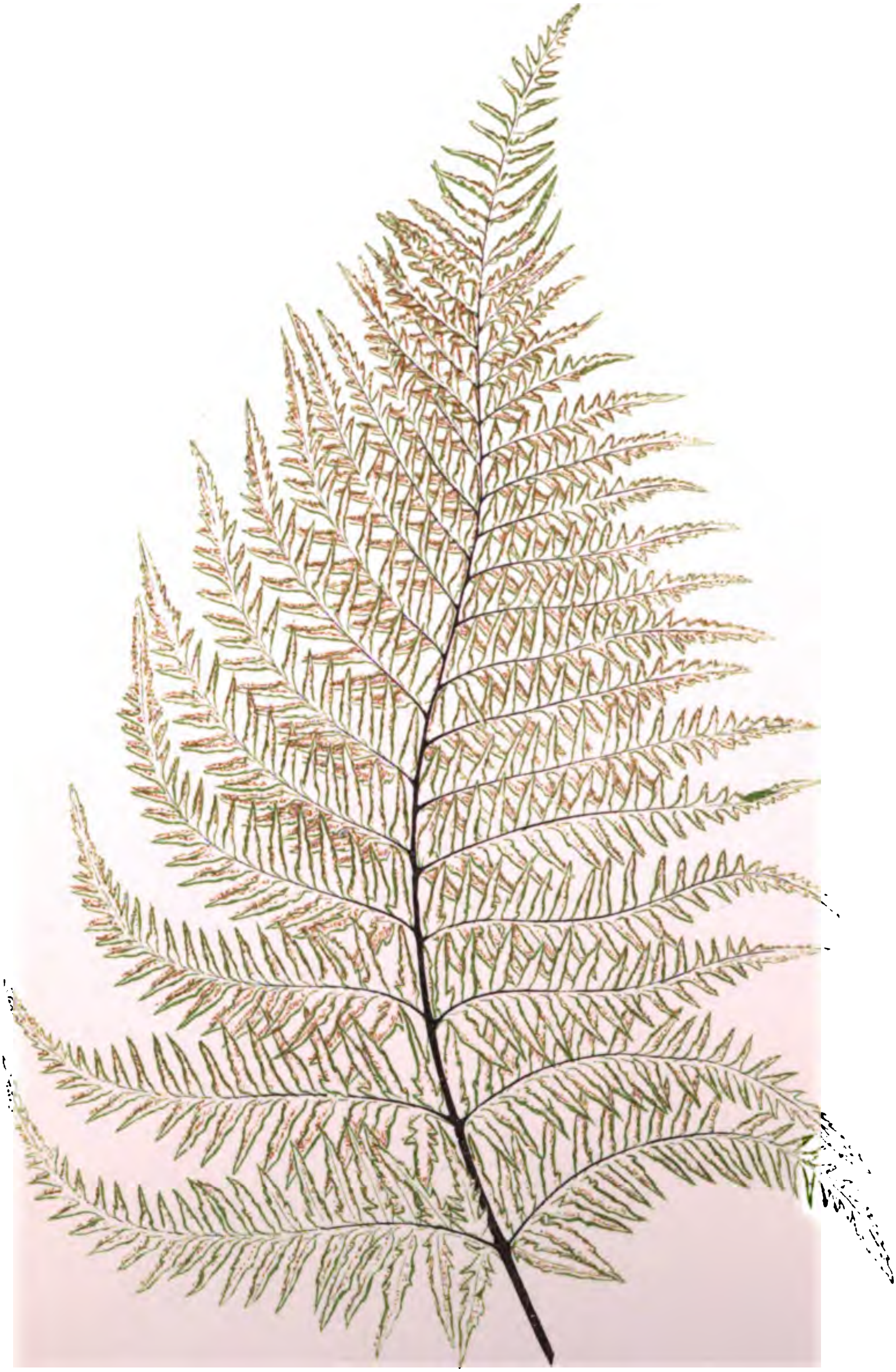
All the young curled-up fronds are densely covered with golden powder, the stem itself being a pale yellowish green, which gradually changes to a shining black as the frond becomes more mature; the changes commencing at the base, and being continued upwards. The pinnules curl upwards, leaving the midrib of the pinnæ in a hollow.

Gymnogramma chrysophylla varies when raised from seed. Mr. Henderson, of Wentworth, has a very pretty pale variety amongst the magnificent collection of Ferns cultivated there. This species varies considerably in size, form, and in the colour of the farina, according to the heat of the stove in which it is grown.

Many persons have experienced difficulties in the cultivation of this lovely plant; yet in a rich soil, mingled with plenty of washed sand, and placed in a stove, it grows luxuriantly; indeed my own experience proves it to be an easy species to manage. One half of the plants lost by gardeners, not only of this species, for the evil is common to all others, is in consequence of the pots being imperfectly drained. Let the plants have abundance of drainage, and use care to prevent the soil from washing amongst it, and if properly attended to in watering, etc., I will guarantee that the mortality amongst plants will very sensibly diminish. The most durable material to use between the soil and the drainage is the water-moss, (any of the several species of *Sphagnum;*) it is common upon most of the English bogs. This moss retains moisture, and is many months before it decays; it seems to have the double advantage of preserving the plant well drained, and at the same time the roofs are kept cool and moist.

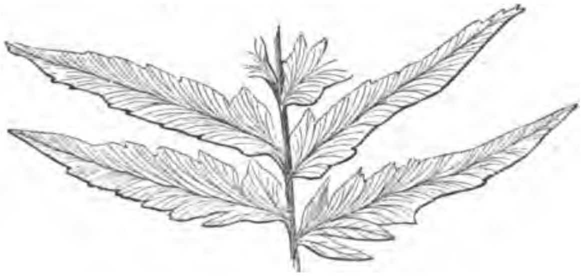
This species is now becoming common, being so readily raised from spores. It is in the Fern Catalogues of Messrs. Henderson, of Pine-apple Place; E. G. Henderson, of the Wellington Nursery; Rollisson, of Tooting; and Backhouse, of York.

The illustration is from a plant in my own collection.



GYMNOGRAMMA CALOMELANOS.

II



Portion of mature Frond, upper side.

GYMNOGRAMMA CALOMELANOS.

Kaulfuss. Moore.

PLATE II.

Gymnogramme calomelanos,	Kunze. Sprengel.
Ceropteris calomelæna,	Link. Fee.
Acrostichum calomelanos,	Linnæus. Schkuhr.
" "	Langsdorff and Fischer.
" "	Raddi. Willdenow.
" "	Swartz. Humboldt.
" *ebenum,*	Linnæus.
" *album,*	Schkuhr.

Gymnogramma—Naked writing. *Calomelanos*—Beautiful black.

This graceful and fine species, known as one of the Silver Ferns, from the under side of the fronds being covered with a farinose powder, is one of the most ornamental of the stove species. It is a native of the West Indies, Jamaica, St. Domingo, Guiana, Brazil, Mexico, the Island of St. Catharine, the Caribbee Islands, etc. An evergreen Fern.

It is a much larger Fern than *Gymnogramma chrysophylla,* the fronds on my specimen exceeding three feet in length, the lower fourteen inches being destitute of pinnæ. The midrib, stipes, and rachis, are an ebony black, terminal and rising from an upright fasciculate rhizoma; the first three inches above the rhizoma being covered with prominent hair, or thin scales, of a brown colour. The young fronds are of a pale green colour. The upper side of the frond is of a dull green colour, whilst beneath it is rendered of a dull creamy white, from the farinose powder spread over it; the stem of the young frond is densely covered with this powder. The form of the frond is bi-subtripinnate, with lanceolate-acuminate pinnules, and lengthened acuminate-lobed segments. The pinnæ stand up vertically from the midrib to which they are attached, the midrib consequently being in a hollow between them, whilst their sections curl down, leaving the central vein, to which they also are attached, above them. The fronds spring from all round the crown of the rhizoma, bending outwards, and ultimately weeping at the apices, leaving the plant very hollow in the centre.

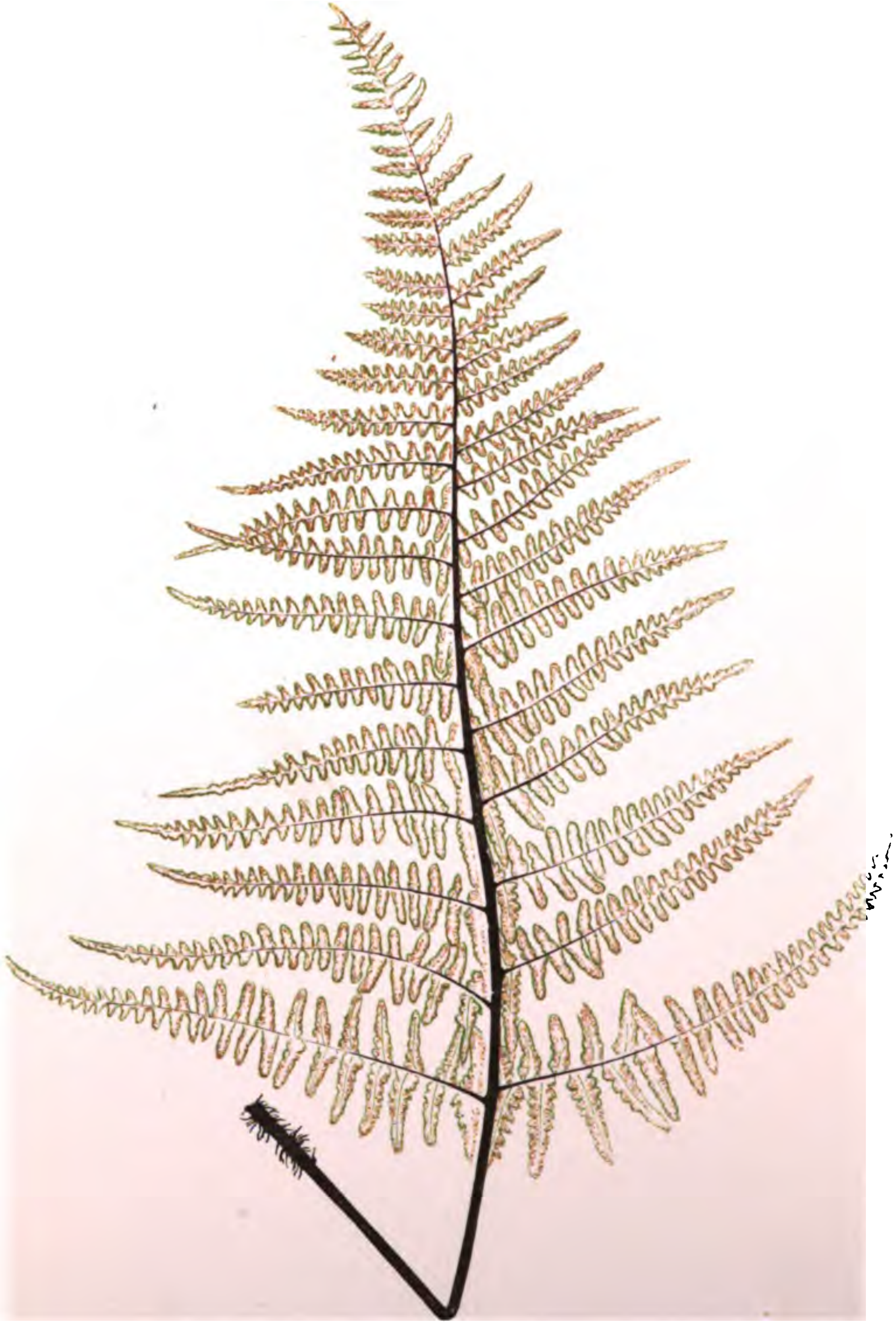
The sori are branched, medial, oblique, and confluent, indeed very nearly covering each segment.

Mr. Moore remarks in his "Genera and Species of Cultivated Ferns," that *Gymnogramma calomelanos* not unfrequently goes under the name of *G. Peruviana* in the English gardens.

The same cultivation as *G. chrysophylla* suits this Fern, it however requires a larger pot than that species.

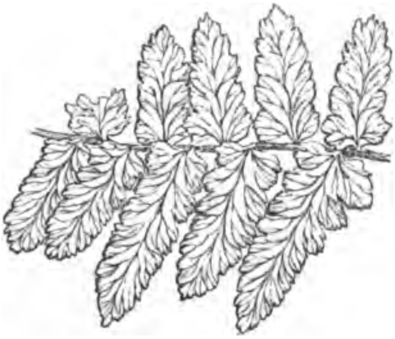
This species is raised freely from sporules. It is in the Fern Catalogues of the before-named Nurserymen.

The illustration is from a very fine specimen in my own collection.



GYMNOGRAMMA TARTAREA.

III



Portion of a young Frond, upper side.

GYMNOGRAMMA TARTAREA.

DESVAUX. SMITH. MOORE.

PLATE III.

Gymnogramma tartarea,	KAULFUSS. WILLDENOW.
Hemionitis dealbata,	WILLDENOW.
Acrostichum tartareum,	SWARTZ.
Ceropteris tartarea,	LINK. FEE.
Gymnogramma dealbata,	OF SOME AUTHORS.
Gymnogramme tartarea,	SPRENGEL.

Gymnogramma—Naked writing. *Tartarea*—Infernal.

THE present Fern more nearly resembles *Gymnogramma calomelanos* than any other species, the chief difference being the form and position of the segments. It is a beautiful evergreen stove species, a native of Mexico, and of the warmer portion of America. The fronds are sometimes three feet long, usually about two feet; the colour of the upper side is a heavy dull green, and beneath it is completely covered with a pure snowy white farinose powder. The form of the frond is bisubtripinnate, having lanceolate-acuminate pinnules, and rounded segments, which are distant, the lower ones being lobed. The colour of the stipes, rachis, and the midrib of the pinnæ is black, and terminal, rising from an erect fasciculate rhizoma.

The sori are linear-medial, oblique, branched, and ultimately become confluent.

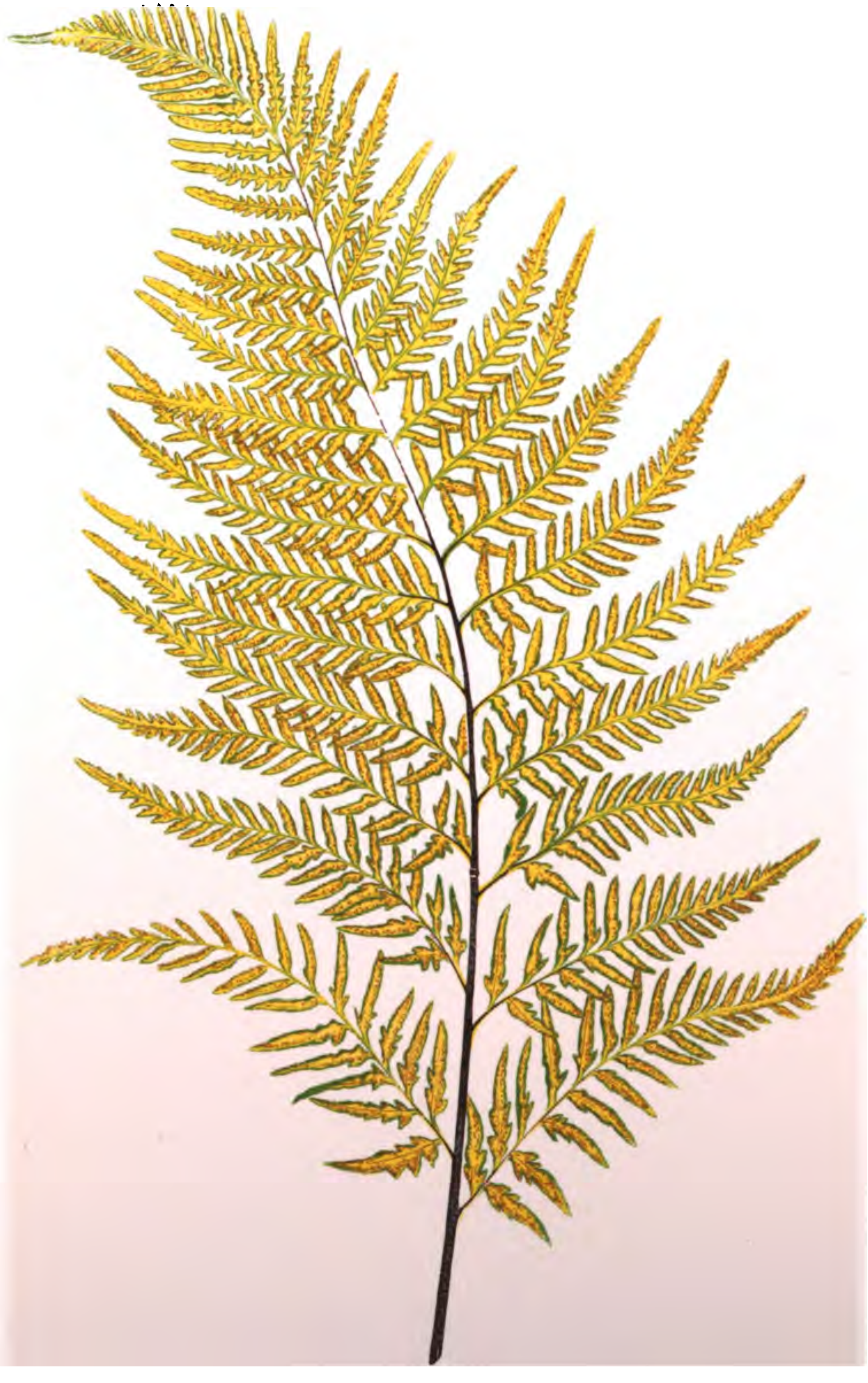
In a frond of three feet in length, the lower ten inches are naked; the pinnæ are nearly flat, so that the midrib is not in a hollow, as with *G. calomelanos*. The base of the frond and the upper portion of the rhizoma are thickly studded with hairs, or thin brown scales. The young frond is of a pale green colour, and covered with white farina. The fronds are placed more horizontal than in *G. calomelanos*, yet leaving the centre hollow.

The farina is purer white than that of *G. calomelanos*. It requires the same cultivation as the former species.

A tolerably abundant species, and easily propagated from spores. It is in the Fern Catalogues of most Nurserymen.

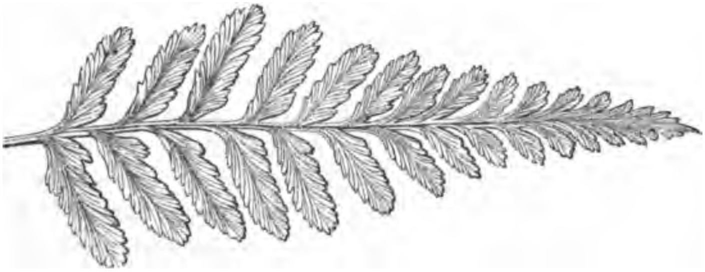
I am indebted to Mr. Henderson, of Wentworth, for some beautiful fronds of *G. tartarea*.

The illustration is from a plant in my own collection.



GYMNOGRAMMA OCHRACEA.

IV



Portion of a young Frond, upper side.

GYMNOGRAMMA OCHRACEA.

PRESL. MOORE.

PLATE IV.

Gymnogramma Massoni,	OF SOME AUTHORS.
Gymnogramme ochracea,	KUNZE.
Ceropteris Massoni,	LINK. FEE.

Gymnogramma—Naked writing.	*Ochracea*—Yellow.

WHERE it is requisite to delineate several Ferns in the same tribe, all of which chance to be exceedingly beautiful, it is somewhat difficult to describe each species in suitable language. Larger in size, more graceful in form, yet less brilliant in the colour of the farinose powder than *Gymnogramma chrysophylla,* this Fern cannot nevertheless be otherwise than greatly admired. It is a very ornamental, compact, evergreen stove species; a native of Peru.

Both *G. ochracea* and *G. chrysophylla* are more numerously supplied with fronds than either *G. calomelanos* or *G. tartarea.*

The fronds are usually not much more than a foot in length; however two specimens which are in my possession have them two feet long.

The colour of the upper surface of the frond is bright shining green, beneath it is covered with an ochre yellow powder. The fronds are terminal, rising from a tufted rhizoma; they are bipinnate, with lanceolate-acuminate pinnæ, and having oblong-linear narrow dentate pinnules. In a frond two feet in length, the lower fourteen inches are naked; the base being more scantily supplied with hairs than is the case either with *G. calomelanos* or *G. tartarea.* The young unfolded frond is of a darker green than in either of the before-mentioned species, and it is more thickly covered with the yellow farina.

The form of the frond of *G. ochracea* before it is unfolded, is very different to the other *Gymnogrammas,* for it is convex, and only immediately below the apex concave with respect to the rhizoma; whilst in the other three species before described it is concave.

The sori are medial, being somewhat scattered on the veins.

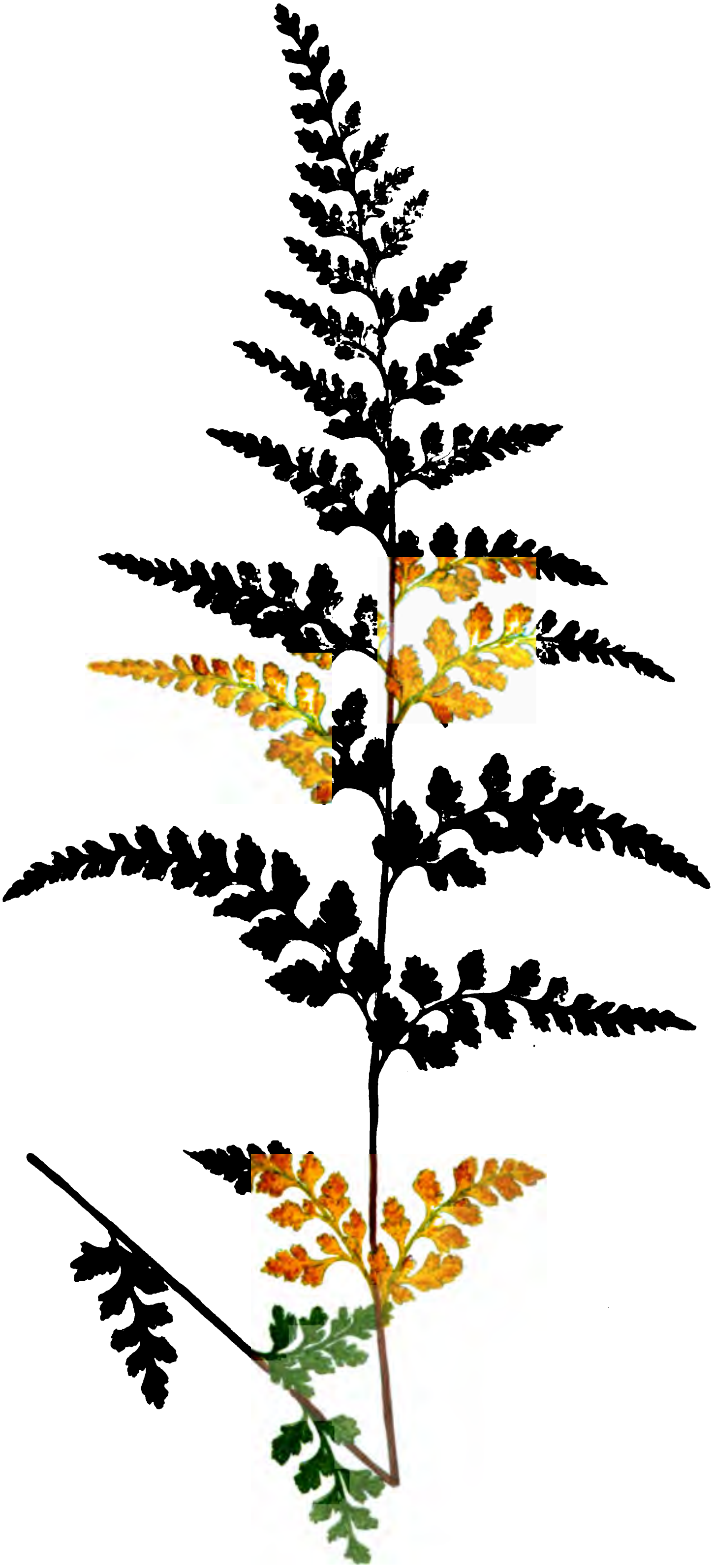
It is very readily propagated from spores.

A similar treatment in the cultivation of this Fern to that adopted with *G. chrysophylla* will be found to answer remarkably well; indeed it seems less delicate than any of the Ferns yet described.

This tolerably abundant species is to be found in the Catalogues of Messrs. Rollisson, of Tooting; Henderson, of Pine-apple Place; and Backhouse, of York.

The illustration is from a plant in my own collection.

Fronds for examination have been kindly forwarded by Mr. Henderson, of Wentworth; Mr. Ingram, of the Royal Gardens, Windsor; and Mr. E. Cooling, Nurseryman, Derby.



GYMNOGRAMMA SULPHUREA.

V

Portion of mature Frond, under side.

GYMNOGRAMMA SULPHUREA.

DESVAUX. MOORE. KAULFUSS. PRESL.

PLATE V.

Gymnogramme sulphurea,	KUNZE.
Ceropteris sulphurea,	FEE.
Acrostichum sulphureum,	SWARTZ. SPRENGEL. SCHKUHR.

Gymnogramma—Naked writing. *Sulphurea*—Sulphur-coloured.

THIS exquisitely beautiful Fern is one of the most interesting of the powdery kinds; it should be in every collection. The form of the frond is extremely elegant, the pinnæ being in pairs, and more widely apart than in *Gymnogrmma chrysophylla:* those nearest the base of the frond are small and of a triangular form, gradually becoming larger and more acuminate as they become farther removed from the rhizoma, and attain the greatest length in the centre of the frond.

It is a native of Jamaica.

It appears to be a delicate species, requiring considerable care and attention to grow it successfully.

G. sulphurea is a stove Fern.

The fronds are fragile and delicate, attaining a length of from six to ten inches. The upper surface is a pale green colour, whilst beneath it is profusely covered with a brilliant sulphur-yellow farinose powder. The frond, which is bipinnate, has the pinnæ of a lanceolate-acuminate form, and with oblong-obtuse pinnatifid pinnules, wedge-shaped at the base, the margin being dentate. The fronds rise out of an erect fasciculate rhizoma.

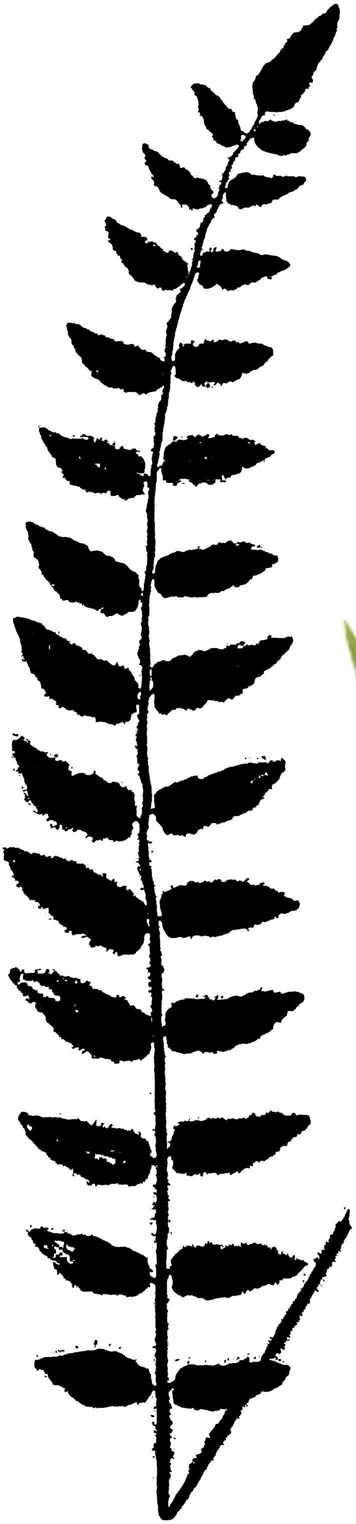
The sori, which are linear, are forked obliquely, becoming, when fully mature, confluent and nearly covering the whole frond.

Mr. Henderson, of Wentworth, has kindly communicated plants and fronds of this species. I am also indebted to Messrs. Booth and Son, of the Flottbecker Nursery, Hamburg, for others, and to Mr. Norman, of Hull, for fronds.

G. sulphurea is not common in cultivation; it is in the Fern Catalogues of Messrs. A. Henderson, of Pine-apple Place; Backhouse, of York; and Booth and Son, of Hamburg.

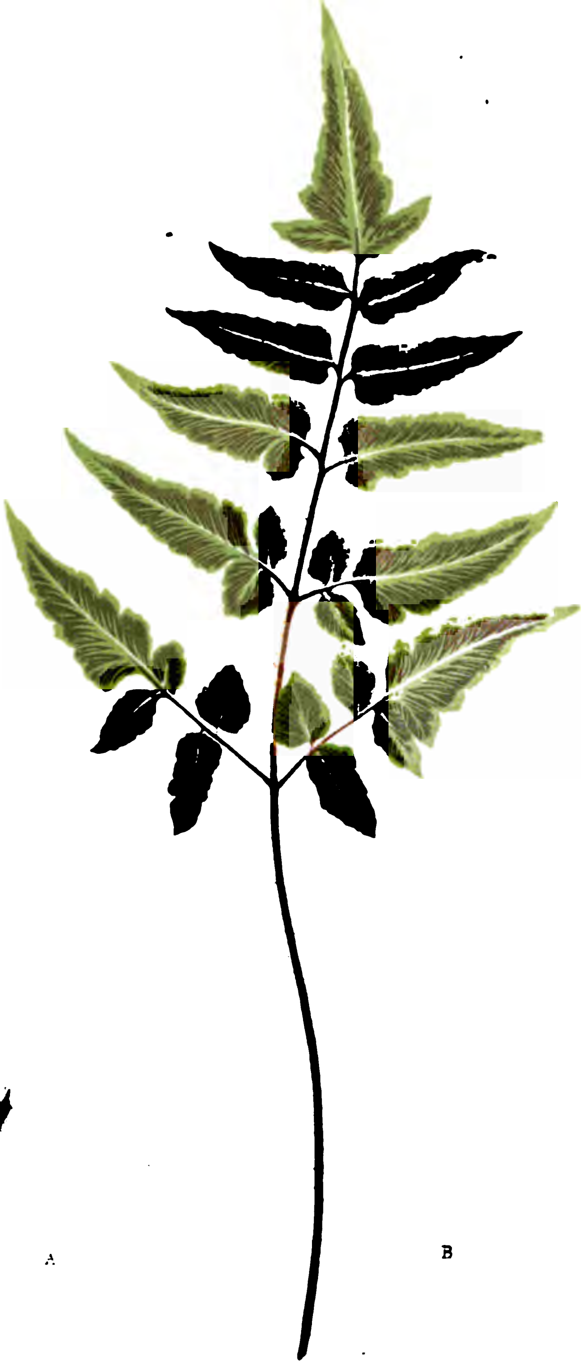
This species requires more washed sand to be mixed with the soil than most other Ferns, plenty of drainage, and it must not be allowed to become dry.

The illustration is from a frond kindly communicated by Mr. Henderson, of Wentworth.



A

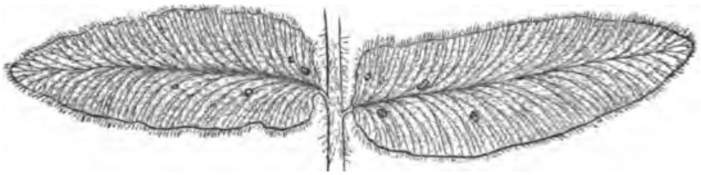
GYMNOGRAMMA RUFA.



B

G. TOMENTOSA.

VI



Portion of mature Frond, upper side.

GYMNOGRAMMA RUFA.

Desvaux. Moore. Smith. Kaulfuss. Presl.

PLATE VI.—A.

Gymnogramme rufa,	Kunze.
Neurogramma rufa,	Link.
Neurogramme rufa,	Fee.
Gymnogramme acuminata,	Willdenow.
Hemionitis rufa,	Swartz. Schkuhr.
“ “	Humboldt and Bonpland.
“ “	Sprengel. Sloane. Suensk.
“ *acuminata,*	Willdenow.
Pteris rufa,	Linnæus.
Asplenium tomentosum,	Lamarck.

Gymnogramma—Naked writing. *Rufa*—Red-*haired.*

Gymnogramma rufa is an interesting species, more nearly resembling *G. tomentosa* than any other Fern, indeed a person not conversant with the distinctive differences of the two species, would probably believe them to be the same plant. The chief difference consists in the frond being pinnate instead of bipinnate, and in the pinnæ being rounded at the apex instead of being acuminate, as is the case with *G. tomentosa.*

It is a native of Mexico and the tropical regions of America.

The fronds vary from one to two feet in length, and are thickly covered with hairs. The rachis and stipes are of a brownish red colour, similar to *G. tomentosa.*

The sori are linear, medial, branched, oblique, and in the more mature state become confluent in every part of the frond.

The form of the frond is pinnate, with oblong-obtuse pinnæ, stalked and caudate at the base, and terminal.

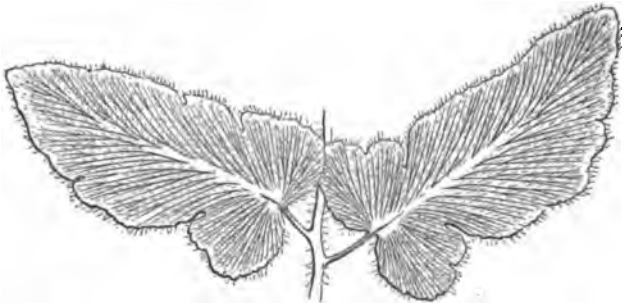
The fronds rise out of an erect fasciculate rhizoma.

This species is an evergreen, and requires to be cultivated in a stove.

I am indebted to Mr. Henderson, of Wentworth, for a plant of this Fern, and also to that gentleman and to Mr. Norman, of Hull, for fructified fronds.

G. rufa may be purchased at a reasonable price of Messrs. Henderson, of Pine-apple Place, and of E. G. Henderson, of the Wellington Nursery.

The illustration is from a plant in my own collection.



Portion of mature Frond, upper side.

GYMNOGRAMMA TOMENTOSA.

Desvaux. Moore. Swartz. Smith. Presl.

PLATE VI.—B.

Gymnogramme tomentosa,	Kunze.
Neurogramma tomentosa,	Link.
Neurogramme tomentosa,	Fee.
Hemionitis tomentosa,	Raddi.
" *Brasiliensis,*	Willdenow.
Ceterach lobatum,	Presl.
Asplenium tomentosum,	Lamarck.

Gymnogramma—Naked writing. *Tomentosa*—Downy.

An ornamental evergreen stove species, requiring care to cultivate it successfully, being a delicate and tender Fern.

It is found in Brazil, and in the West Indies.

The stipes and rachis are black and densely covered with reddish brown hairs, terminal, and rising out of an erect fasciculate rhizoma.

The sori, which are linear, medial, and obliquely branched, are very copious, covering all the veinlets of the pinnæ. The colour of the sori is of a reddish brown.

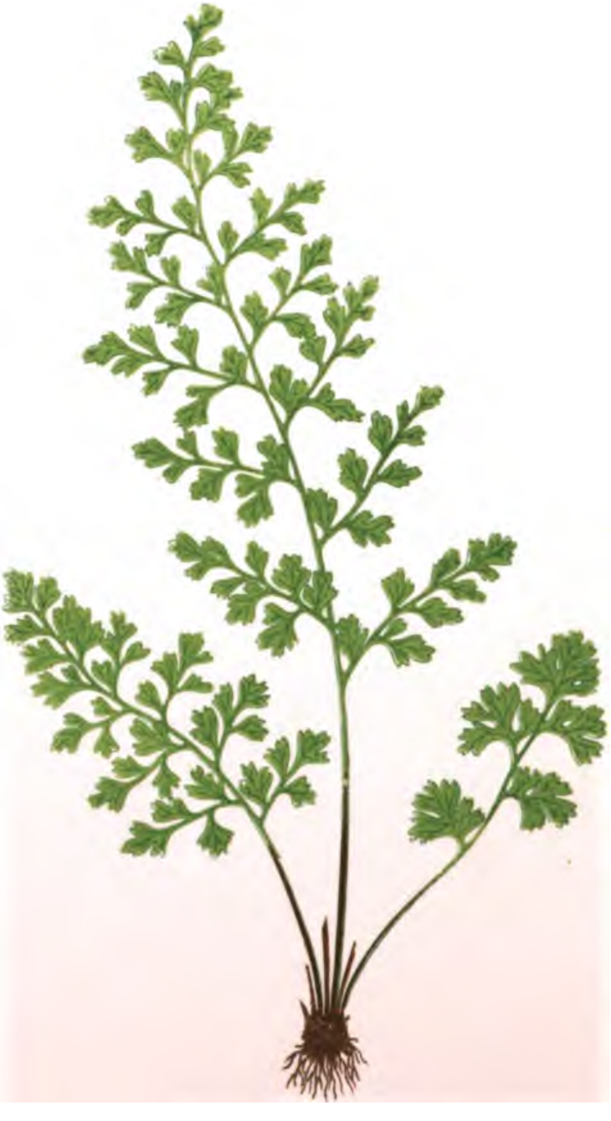
The fronds, which attain a length of two feet, are hairy and membranous. In form they are bipinnate, with oblong-obtuse pinnules; the lower ones, and sometimes three fourths of the pinnæ, being caudate at the base, terminal, one-lobed, and acuminate.

I am indebted to Messrs. Booth and Son, of Hamburg, and Mr. Henderson, of Wentworth, for plants of this species, and also to them, and to Mr. Norman, of Hull, for well-grown and nicely fructified fronds.

A tolerably abundant Fern, which may be procured from Messrs. Veitch, of Exeter; A. Henderson, of Pine-apple Place; E. G. Henderson, of the Wellington Nursery; Rollisson, of Tooting; Backhouse, of York; and Booth and Son, of Hamburg.

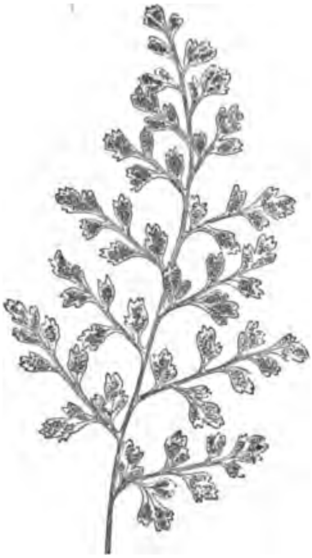
This species requires a rich soil, with plenty of pot-room to enable it to become a good specimen.

The illustration is from a frond sent by Mr. Henderson, of Wentworth.



GYMNOGRAMMA LEPTOPHYLLA.

VII



Pinna of mature Frond, under side.

GYMNOGRAMMA LEPTOPHYLLA.

Desvaux. Moore. Newman. Hooker and Greville.
Sprengel. Kaulfuss. Presl.

PLATE VII.

Gymnogramme leptophylla,	Kunze.
Grammitis leptophylla,	Swartz. Wood. Sprengel.
" "	Willdenow. Mohr. Webb.
Acrostichum leptophyllum,	De Candolle.
Anogramme leptophylla,	Fee.
Anogramma leptophylla,	Link.
Hemionitis leptophylla,	Lagasca.
Polypodium leptophyllum,	Linnæus. Schkuhr. Swartz.
Osmunda leptophylla,	Lamarck.

Gymnogramma—Naked writing. *Leptophylla*—Slender-leaved.

The "Annual Maidenhair," *Gymnogramma leptophylla*, is unusually interesting, inasmuch as it widely differs from nearly all the other species of Ferns in being an annual; and the interest in this lovely plant is increased from the circumstance that it is the solitary British representative of this magnificent tribe.

G. leptophylla is a native of the warmer portions of Europe. It is found in France, Brittany, Provence, Italy, Naples, Sicily, Germany, Spain, Switzerland, Algeria, Abyssinia, Mexico, the Island of Jersey, the Canary Isles, and in the Azores.

It is a slender and delicate Fern, requiring to be cultivated in a stove.

The fronds are bipinnate and smooth, and the pinnules are two or three-lobed, and of a roundish cuneate form, whilst each individual lobe is bluntly dentate. This species seldom bears more than two or three fronds at one time, which rise out of a slightly hairy erect crown. The fronds are rigid, and are two or three inches in length. They stand up erect from the rhizoma.

The fructified fronds are not contracted, and nearly the whole of them are fertile. The sori are branched and become confluent.

G. leptophylla and *G. chærophylla* are both so different in habit and general appearance from other members of this elegant family, that great diversity of opinion is expressed amongst the various authorities in cryptogamic botany as to whether it would not be better to remove them altogether from *Gymnogramma*. Fée separates these two species, together with about a dozen others, not in cultivation in England, and calls them *Anogramme*.

To the general observer *G. leptophylla* bears some resemblance to the *Cystopteris* family; but the arrangement of the fructification and the form of the reproductive organs are very dissimilar in these two tribes. Much confusion is prevented by retaining such species as can with propriety be retained in the respective families in which they have so long been recognised, and consequently under which names they are familiar to Fern cultivators generally. In the present instance it appears unwise to alter the name from *Gymnogramma*, although it seems to bear so little affinity to the *Gymnogramma* family.

This species is added to our British plants from the circumstance of its occurrence in the Channel Islands, where it appears to be widely distributed.

It seems to delight where the liverwort *(Marchantia)* grows, on exposed damp banks.

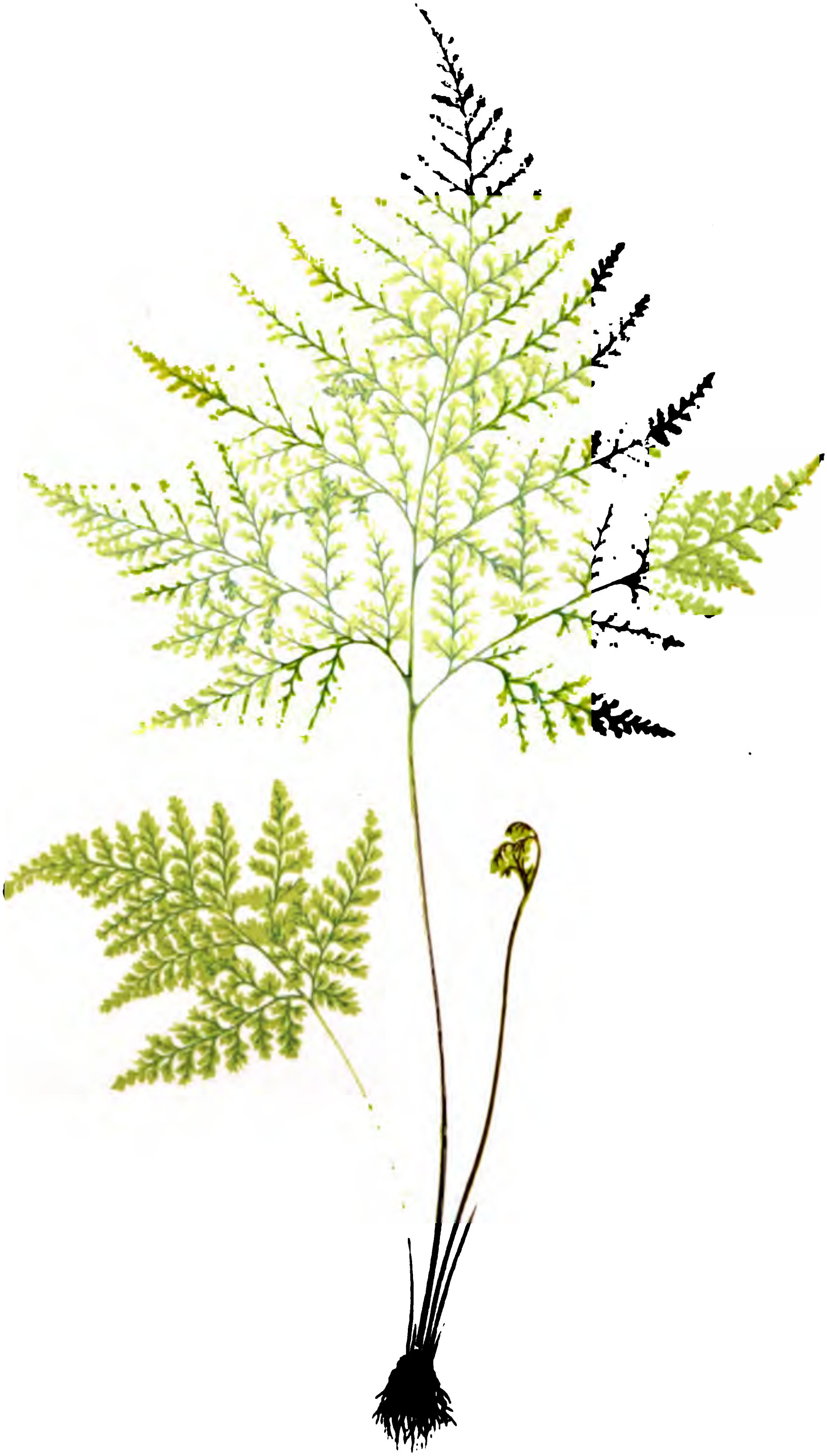
The above Fern is an annual, therefore the cultivator is compelled to raise it year by year from spores. If cultivated in light loam, using plenty of fine washed sand, and kept moist by means of a bell-glass, it may be grown with success. I have adopted the plan of growing the *Marchantia* all round the plants, and this arrangement suits other species, especially those having a creeping rhizoma—*Struthiopteris Germanica*, *Lomaria spicant*, and *Polypodium phegopteris* flourish amongst liverwort and the wood sorrel, *(Oxalis acetosella,)* but this latter must be kept within bounds, or it would soon take possession of a whole Fernery, to the exclusion of the more delicate and dwarfer species.

As some of the finest Ferns can only be propagated from spores, and this applies to the annual species and to many of those which have an upright rhizoma, it appears desirable to point out the best way of raising them from seed. The following method answers remarkably well:—A seed saucer is filled within an inch of the top with drainage, upon this is a layer of sphagnum moss, above which is a mixture of loam, leaf-soil, and broken sphagnum, with plenty of sand; the sphagnum to mix with the soil must be perfectly dry, for it should be broken into small pieces by rubbing between the hands. When the pan is prepared, let it be well watered, and left for several hours before the spores are sown. After the spores are scattered on the surface of the soil, a hand glass must be placed over the saucer, and the air excluded by tightly packing outside the base of the glass with wet sphagnum. If managed in this manner, the spores will not require watering for a considerable time; and this is a great advantage, for watering is not desirable if it can be avoided; however, the soil must not be allowed to become too dry. If the spores have been rubbed from off a fresh frond they will be almost certain to grow. Some species are several months before they germinate. It is also desirable to place, in a shady situation in the Fern-house, a board, on which is a layer of clay about half an inch thick; the Fern seeds which are flying about the hot-houses, will germinate from time to time on this board, without any trouble whatever. This will be found extremely useful to the cultivator, for first one class of Ferns will spring up, and then another, so that many species may be propagated upon the same board. It seems very desirable to give every facility for the spores of the Ferns to germinate, as seedlings are frequently raised in this natural manner when every effort and care to produce them under glass has resulted in disappointment.

Fronds, and young plants in the marchantiaform state, have been obligingly forwarded by Mr. Robert Wakefield, London; and by Mr. G. B. Wollaston, of Chiselhurst, Kent.

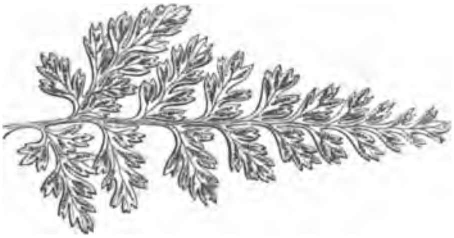
This species may be procured of Messrs. Henderson, of the Pine-apple Place Nursery.

The illustration is from a frond kindly furnished by Mr. Henderson, of Wentworth.



GYMNOGRAMMA CHÆROPHYLLA.

VIII



Portion of young Frond, under side.

GYMNOGRAMMA CHŒROPHYLLA.

Desvaux. Smith. Hooker and Greville.
Swartz. Presl.

PLATE VIII.

Gymnogramma chærophyllum,	Kaulfuss.
" *minor,*	Link.
Gymnogramme chærophylla,	Kunze.
Anogramma chærophylla,	Link.
Anogramme chærophylla,	Fee.
Hemionitis chærophylla,	Poiret.
Grammitis scandicina,	Willdenow.

Gymnogramma—Naked writing. *Chærophylla*—Chervil-leaved.

Although the present species is placed amongst the *Gymnogrammas,* on account of the manner of fructification being so very similar to that tribe, yet in general appearance it differs very materially from the plants already described, having the delicate fragile semblance of the *Cystopteris* family. In habit, this species approaches nearest to the *Gymnogramma leptophylla,* but it exceeds it considerably in size, and in the number of fronds which it bears at one time.

This Fern is a native of the West Indies, Brazil, Paraguay, Jamaica, Monte-Video, and various parts of South America.

G. chœrophylla, like *G. leptophylla,* is one of those rare exceptions in the Fern tribes, being an annual instead of a perennial, and as this species lives but a single year, it is fortunate that it is readily produced from spores. Care should be taken to sow this species in the pot in which it is intended to be cultivated, as it is a precarious plant to be transplanted.

A rich light soil, with abundance of washed sand appears to suit this Fern; when nicely managed a very ornamental and delicate-looking specimen may be procured.

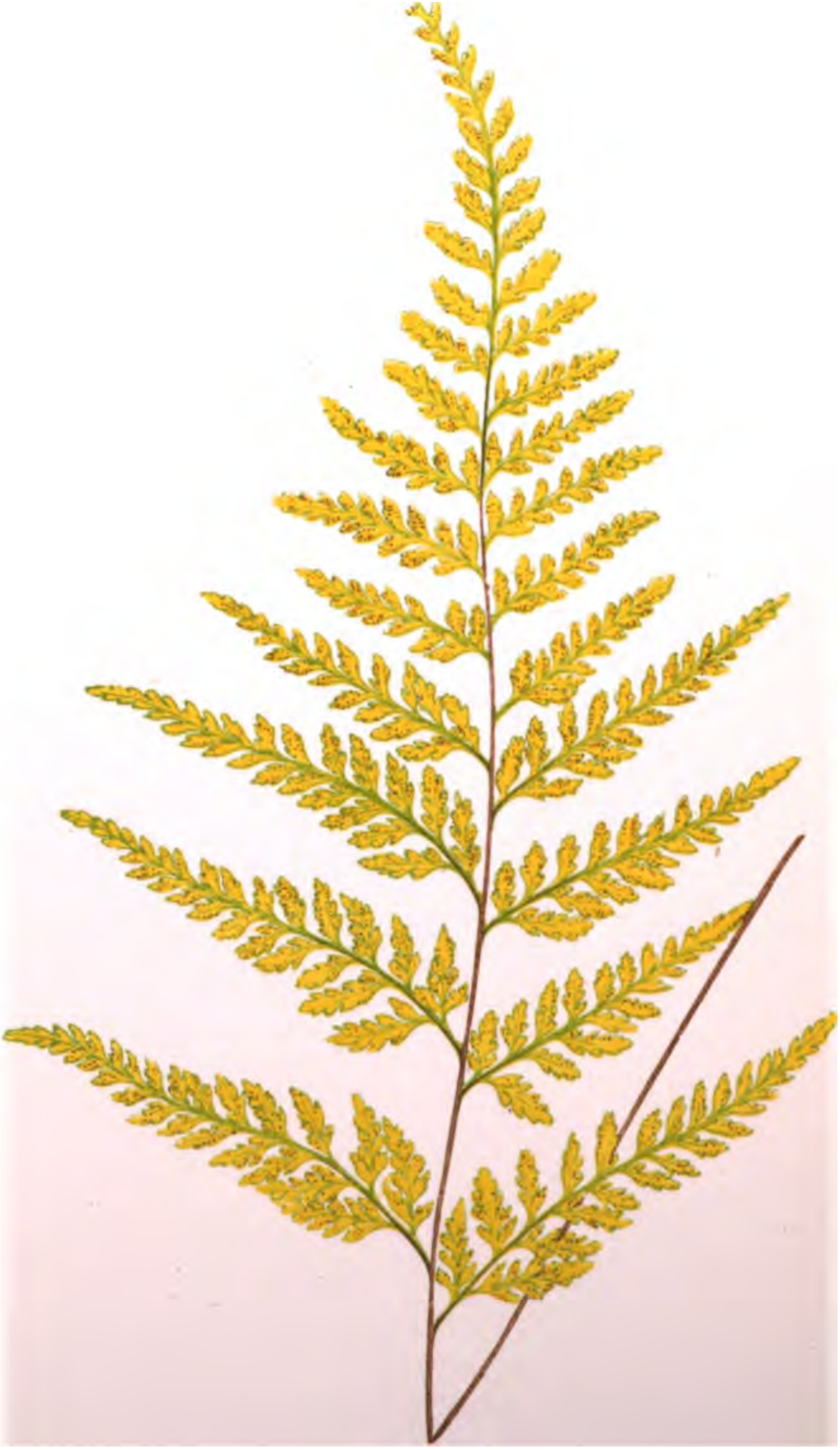
It is a stove Fern.

The fronds are decompound, triangular, semitransparent, and of a brilliant green colour, usually attaining a height of six or eight inches, occasionally, however, it may be grown larger. Some beautiful plants which I received from Mr. Henderson, of Wentworth, were fourteen inches high, the fronds being devoid of pinnæ for half this length, and were from four to six inches across in the widest part. It has roundish-ovate pinnatifid pinnules, which are deeply toothed on the edges, being wedge-shaped at the base.

The fruitful fronds are upright, the pinnules of which are very much contracted. The fructification is copious, becoming confluent and covering the whole frond.

G. chœrophylla can be procured of Messrs. Henderson, of Pine-apple Place, and Backhouse, of York.

The illustration is from a plant kindly communicated by Mr. Henderson, of Wentworth.



GYMNOGRAMMA L'HERMINIERI.

Mature Frond—under side.

IX

Portion of mature Frond, upper side.

GYMNOGRAMMA L'HERMINIERI.

BORY.

PLATE IX.

Gymnogramme L' Herminieri,	KUNZE.
Ceropteris L' Herminieri,	FEE.

Gymnogramma—Naked writing. *L' Herminieri*—Named after L' Herminier.

THIS very beautiful Fern is exceedingly rare in cultivation in this country, it is similar to *Gymnogramma chrysophylla,* but more slender, and smaller in size; the pinnæ are also broader at the base, and considerably more attenuated at the apex. In general appearance it has a character half-way between *G. sulphurea* and *G. chrysophylla.* The acuminated apex of the frond is more drawn out than in *G. chrysophylla,* and the farinose powder on the under side of the frond is in colour lighter than that of *G. chrysophylla,* and darker and more yellow than that of *G. sulphurea.*

The frond rises out of a short erect rhizoma, and is scarcely ever more than ten inches in length, and three and a half inches across in the widest part, usually six inches in length. The colour of the stipes and midrib is a pale reddish brown, being much lighter, and has not quite so much of the polished appearance of *G. chrysophylla*. The colour of the frond, on the upper side, is a pale dull yellowish green, whilst beneath it is densely covered with a brilliant farinose powder of a light yellow colour.

Mr. Moore remarks that the sori are often crowded, and consequently, as Kunze says, more dense than in *G. chrysophylla*. They are linear, and after a time become confluent.

The form of the frond is broadly triangular, caudate, or attenuated at the apex, bipinnate; pinnæ alternate, attenuated at the apex; pinnules oblong, obtuse or acutish, the lower ones cuneate at the base, pinnatifid, with obovate, often bifid, segments.

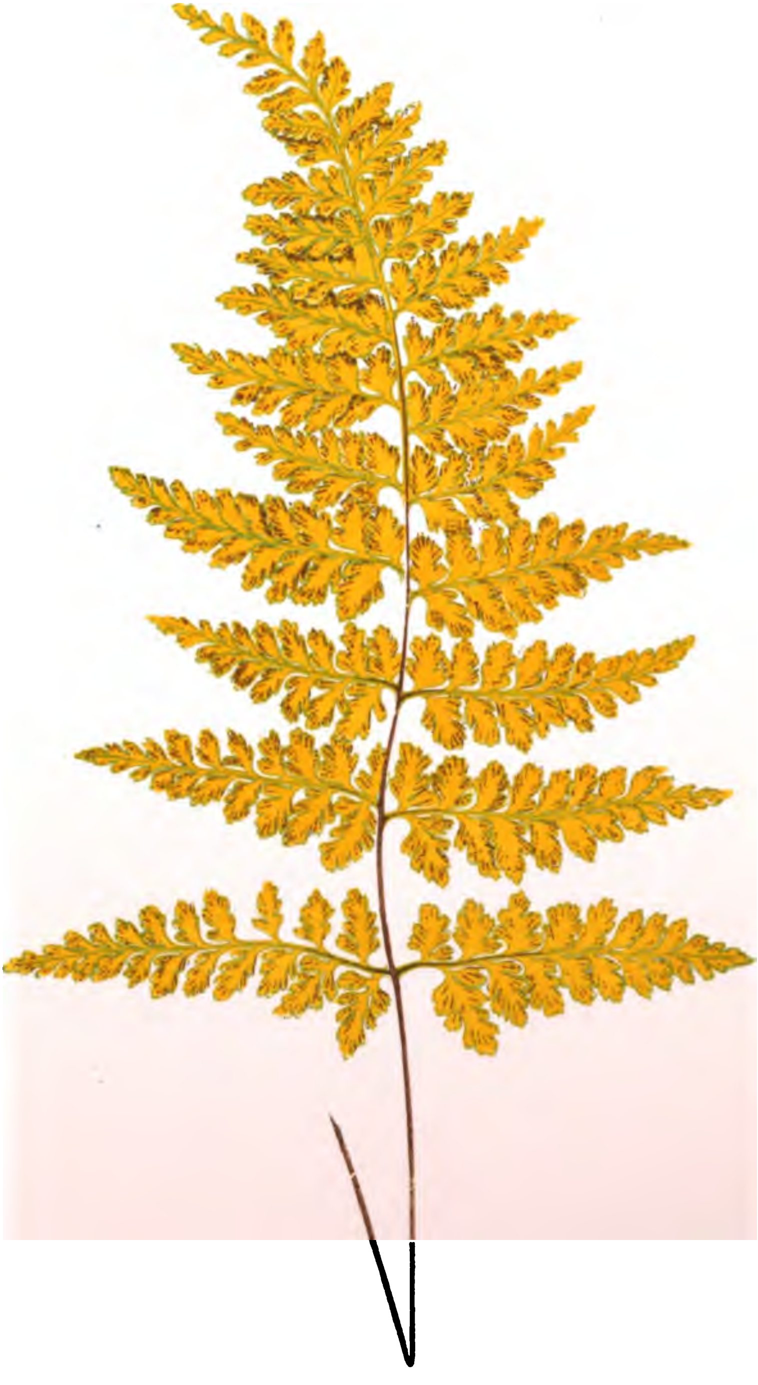
This is a stove species, and apparently a delicate Fern, and will probably require considerable care in its cultivation.

It is a native of the Island of Guadaloupe, one of the largest of the Caribbee Islands, a range of islands in the West Indies, which divides the Atlantic Ocean from the Caribbean Sea.

I am indebted to Sir William Hooker, of the Royal Gardens, Kew; to Mr. Moore, of the Chelsea Botanic Gardens; and to Mr. G. Norman, of Hull, for fronds of this interesting Fern.

G. L' Herminieri is not in the Catalogues of any of our English Nurserymen; it is, however, contained in that of Messrs. Booth and Son, of Hamburg.

The present illustration is from a frond communicated by Mr. Norman.



GYMNOGRAMMA CHRYSOPHYLLA.

Mature Frond—under side.

X

Portion of young Frond, upper side.

GYMNOGRAMMA MARTENSII. Bory.

See Plate I. (Plate X., the true G. chrysophylla.)

Gymnogramma Martensii,	Moore and Houlston.
" *hybrida,*	Martens.
Gymnogramme Martensii,	Kunze.
Ceropteris Martensii,	Fee.
" *chrysophylla var. Martensii,*	Link.

Gymnogramma—Naked writing. *Martensii*—M. Martens, a writer on Ferns.

The present species, by the advice of several authorities upon Ferns, has been separated from that of *Gymnogramma chrysophylla.* When this work was commenced, I did not then like to do otherwise than consider *G. Martensii* as a variety of *G. chrysophylla,* and as the latter form, (more commonly known as *G. chrysophylla,* true,) was not so universally cultivated as the Fern *G. Martensii,* when the first Part of this work was prepared for the press, I determined to figure the form which is now to be considered as representing *G. Martensii,* not then thinking it desirable to figure both of these Ferns. Lately I have seen so many plants of the two forms *G. chrysophylla* and *G. Martensii,* and the distinctive characters of each are so constant in every instance, that I now willingly follow the advice of several friends, and figure both species, it will therefore merely be requisite to reverse the plates, considering Plate I. as *G. Martensii,* and Plate X. as *G. chrysophylla.*

Link considered the present Fern a hybrid variety between

G. calomelanos and *G. chrysophylla.* Under similar cultivation *G. chrysophylla* is less in size, more triangular in form, has the pinnules more expanded, and is not so acuminate at the apex of the pinnæ. The colour of the stipes is a shining brownish red. It is perhaps the handsomest of the farinose-powdered Ferns, being the most golden of the genus.

In describing *G. Martensii,* it is desirable to state that it is cultivated by most Fern growers, under the name of *G. chrysophylla,* indeed, although the name occurs in almost all the Nurserymen's Catalogues, *G. Martensii* is the plant which they usually supply. In the midland counties I have only seen the true form of *G. chrysophylla* at Wentworth, and at Allestree Hall, near Derby.

In *G. Martensii* the length of the frond varies from eighteen inches to two feet, however rarely the latter, it often does not exceed twelve inches. If grown in a cool stove it is a dwarf species, but with an increase of heat an increase in the length of the frond is obtained. The colour of the upper surface is a dull yellowish green, whilst beneath it is covered profusely with a rich yellow farinose powder. The form of the frond is bipinnate, with lanceolate pinnæ, and elongated or roundish pinnatifid pinnules, the segments being toothed. The fronds grow out of an erect tufted rhizoma. The sori are medial, and become confluent, eventually covering the whole frond.

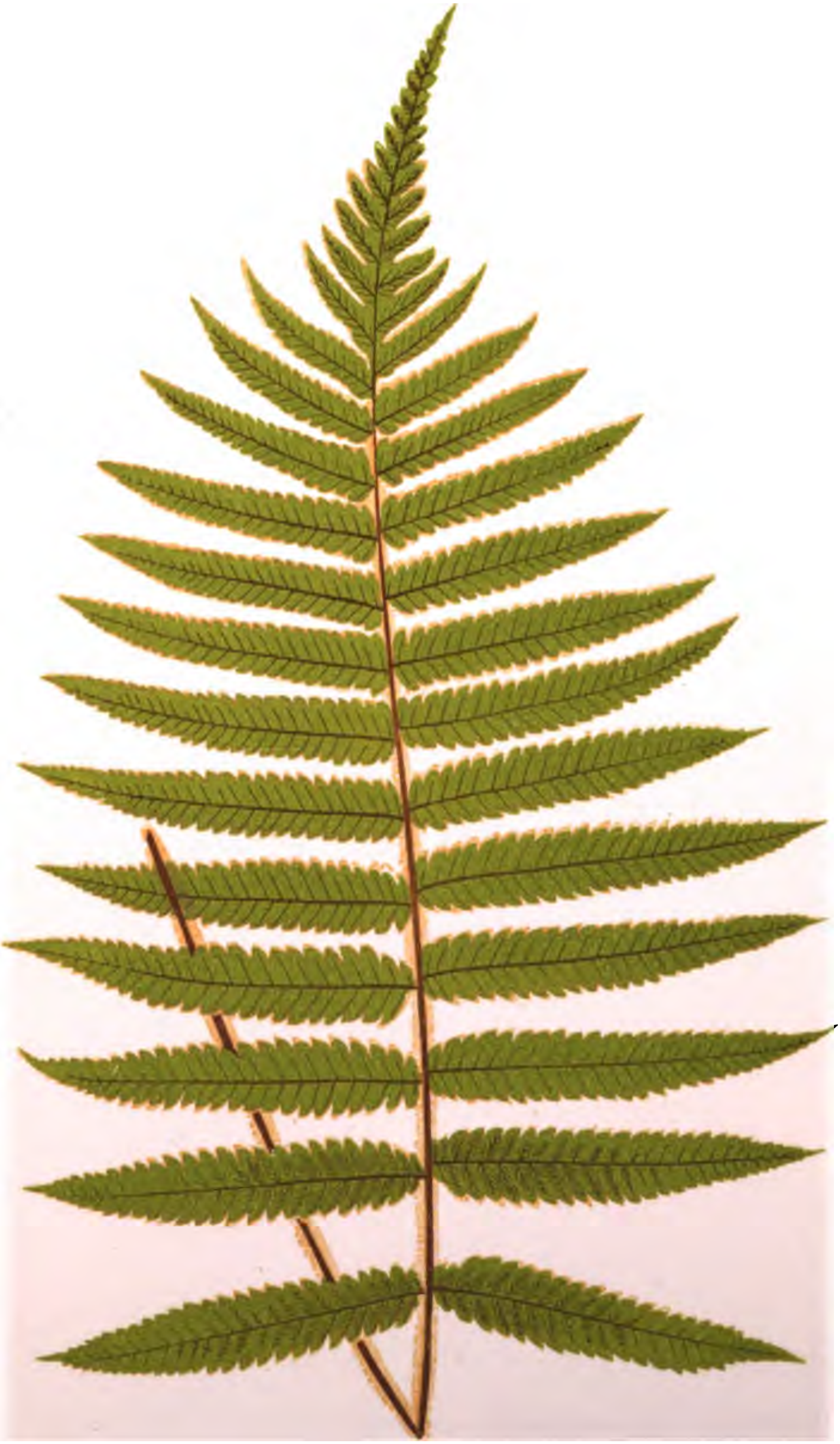
This is a stove species, although it will succeed tolerably well in a warm greenhouse.

It is a native of South America.

To cultivate this Fern properly, it requires plenty of pot-room, good drainage, with a rich soil intermixed with broken pot.

I am indebted to Sir William Hooker, of the Royal Gardens, Kew; Mr. Moore, of the Botanic Gardens, Chelsea; Mr. Henderson, of Wentworth House; and Mr. E. Cooling, Nurseryman, Derby; for fructified fronds of *G. Martensii;* and to Mr. Dryden, gardener to William Evans, Esq., Allestree Hall, near Derby, and Mr. Norman, of Hull, for beautiful fronds of the true *G. chrysophylla.*

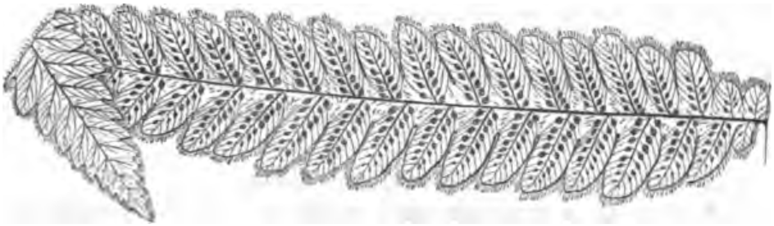
I am indebted to Mr. Dryden, for the frond illustrated in Plate X.



GYMNOGRAMMA VILLOSA.

Mature Frond – upper side.

XI



Portion of mature Frond, under side.

GYMNOGRAMMA VILLOSA.

LINK.

PLATE XI.

Gymnogramme villosa,	KUNZE.
Anogramme "	FEE.
Leptogramma "	J. SMITH.
" "	MOORE AND HOULSTON.
Grammitis "	PRESL.

Gymnogramma—Naked writing. *Villosa*—Shaggy.

THE present and the next species, by some of our principal authors upon Ferns, have been separated from the *Gymnogrammas,* and placed together with a few others in a separate genus called *Leptogramma.* Those classed as *Leptogramma* differ from the *Gymnogrammas* from the circumstance that in the *Leptogramma* the veins and sori are simple; the rhizoma and the general habit of growth are unlike that of the *Gymnogrammas.* In the elongated sori they resemble the genus *Grammitis.* In the venation and general habit, there is a striking similarity with some of the *Polypodiums,* but in the sori they differ widely from this latter genus. On carefully considering all the characters of these plants, it appears desirable to retain the *Leptogrammas* amongst the *Gymnogrammas,* in preference to forming another genus, a plan which has been adopted by Schlechtendal, Kunze, etc.

In *Gymnogramma villosa* the fronds are two feet long; in form they are bipinnatifid, reclining, with linear-lanceolate acuminate pinnæ, and rather egg-shaped bluntly acuminated segments.

The sori are medial, oblique, and oblong.

The rhizoma is cæspitose and creeping, and the fronds are lateral.

It is a rare species in cultivation in England, and requires to be grown in a stove.

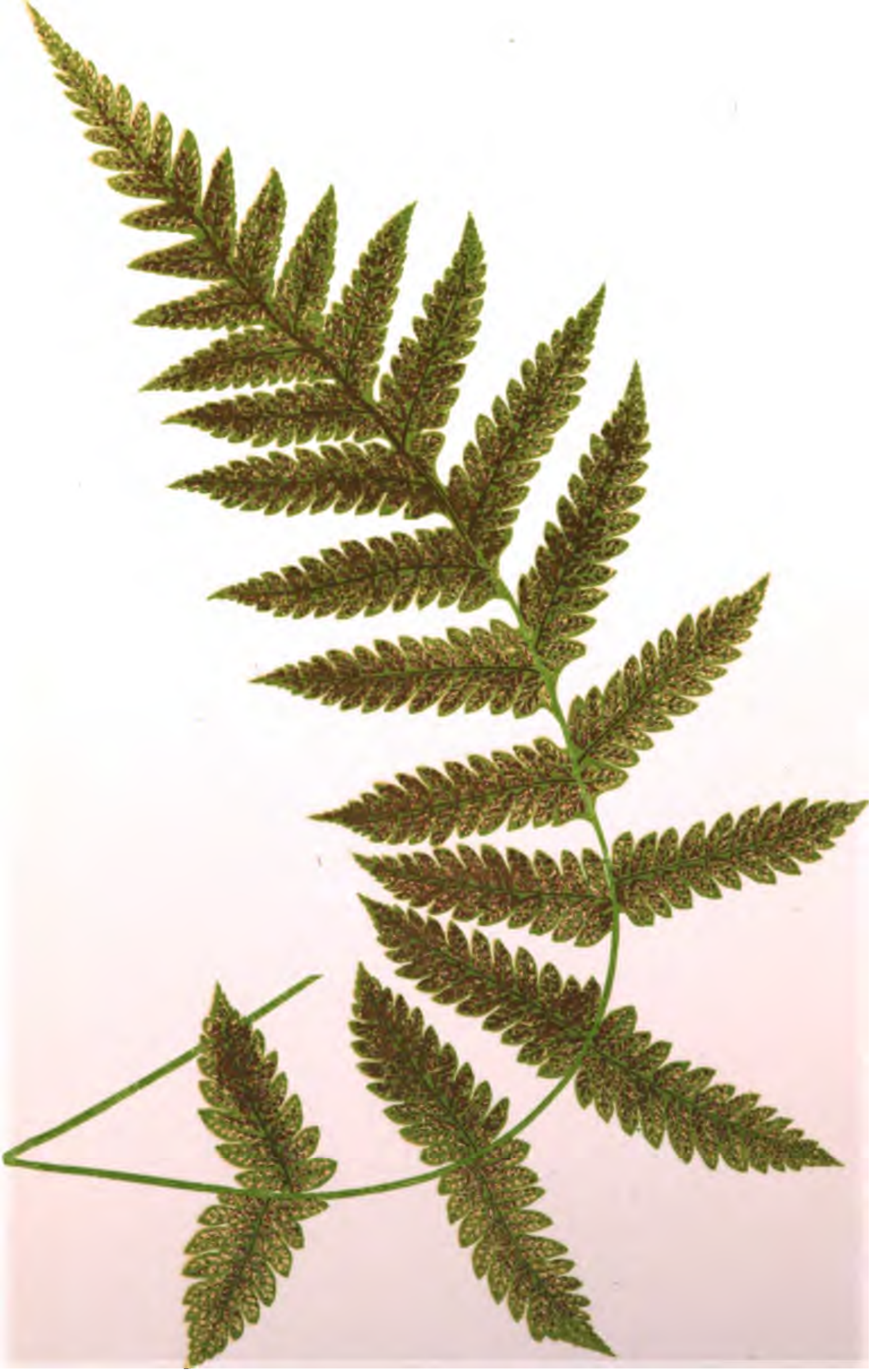
G. villosa is a native of Brazil.

It requires plenty of pot-room to cultivate it successfully.

The above species is not included in any of the English Nurserymen's Catalogues; it can be procured from Messrs. Booth, of Hamburg.

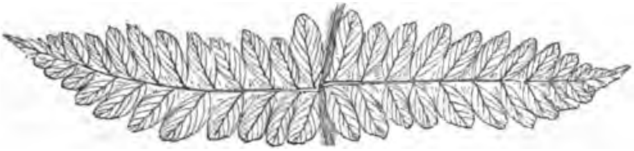
I am indebted to Mr. Henderson, of Wentworth; and to Mr. Norman, of Hull, for fructified fronds of this species.

The illustration is from a frond kindly forwarded by Mr. Norman, to whom I am indebted for many plants and fronds of rare Ferns, as well as for the loan of several valuable foreign works upon the different Filices.



GYMNOGRAMMA TOTTA.

XII



Portion of mature Frond, upper side.

GYMNOGRAMMA TOTTA.

SCHLECHTENDAL. MOORE, (M S.)

PLATE XII.

Gymnogramme totta,	FEE.
Gymnogramma Lowei,	HOOKER AND GREVILLE.
Leptogramma "	HOOKER. SMITH.

Gymnogramma—Naked writing.	*Totta*—From Hottentot.

Gymnogramma totta is a very rare Fern in cultivation in England. It is a handsome species.

The fronds, which are hairy, are lanceolate in form, and from eighteen inches to two feet in length; the colour is palish green; pinnate, pinnæ sessile, oblong bluntish, pinnatifid, the upper ones being adnate; lobes blunt, veins forked or pinnate, the lower pair occasionally anastomosing. Rhizoma creeping and scaly. Stipes scaly, terminal, and adherent.

The sori linear, simple, and sometimes very profuse.

In cultivation it requires a warm greenhouse.

It is a native of Madeira, Cape of Good Hope, and the East Indies.

Formerly, *G. totta* and *G. Loweii* were considered distinct from each other; the former being the Indian form of it, and the plant described by Schlechtendal; and the latter, which was named after the Rev. Mr. Lowe, (a Botanist,) the Madeira form. They are now, however, considered to be one and the same plant.

I am not aware that it is included in any of the Nurserymen's Catalogues.

I am indebted to Sir W. J. Hooker, for a beautiful frond grown in the Fern-house at Kew; and to Mr. T. Moore, of Chelsea, for an Indian frond.

The illustration is from a frond kindly sent to me by Sir William Hooker.

GENUS II.

NOTHOCHLÆNA. ROBERT BROWN.

THE genus *Nothochlæna* is scarcely inferior in interest to that of *Gymnogramma*. These Ferns are on the whole small, elegant, and compact plants, and most of them are natives of warm climates. There is no British representative of this family, one species, however, the *Nothochlæna vestita*, from North America, is sometimes sold by the smaller Nurserymen for the English *Woodsia ilvensis.*

The derivation of the word *Nothochlæna* is from *nothos*—spurious, and *chlaina*—a cloak; a name given on account of several of the species appearing to have an involucre.

The veins of the frond are either forked or pinnate, the venules being free. The spore-cases, (or sporangia,) terminal. The sori are circular and solitary, ultimately becoming confluent; they are situate near the apex of the venules, producing a linear, continuous, or interrupted marginal belt.

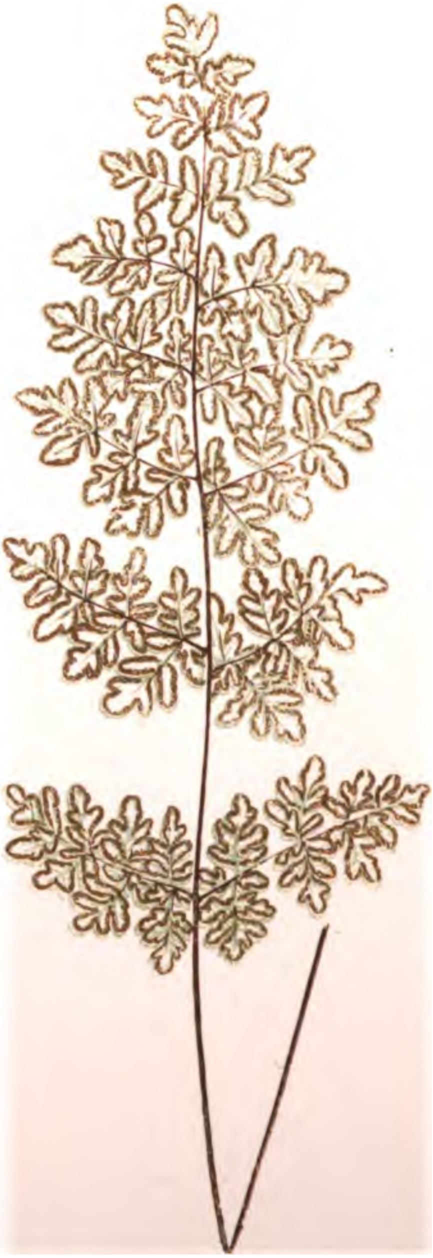
The fronds are pinnate, or bipinnate, some of the species hairy, others woolly, densely scaly, or covered beneath with a farinose powder, through which the sporangia protrude; usually there are but few spore-cases to each sorus. In some species the margin of the frond is slightly reflexed.

The rhizoma is cæspitose.

Most of the plants in this genus are difficult to cultivate, requiring great care, especially in winter, to keep water off the fronds, as, from their construction, they have the property of retaining moisture, and are therefore apt to decay.

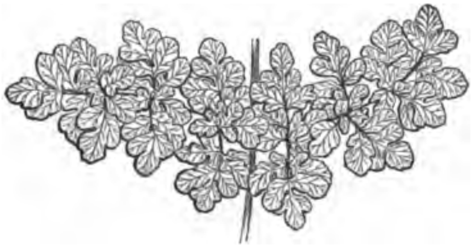
The Ferns in *Nothochlæna* differ from *Gymnogramma* in the form of the sori, otherwise, the species with farinose powder and those which are hairy, indicate a certain degree of affinity with this genus. The free veins and terminal sori place them near the *Polypodium*, from which, however, they differ in the sori being mostly confluent, and the margin slightly reflexed. They also approach *Cheilanthes*, in having the margin of the frond reflexed.

It is perhaps desirable to state that those species which are exceedingly rare in cultivation, will not be described until the completion of the present volumes. This plan has been adopted with the *Gymnogrammas* for two reasons, the first, because before the work is completed, other species will have been introduced, which will render it necessary to publish a supplementary volume, and the second, that by describing almost unknown species as the work proceeds will defer the figuring of the Ferns which are more generally known and cultivated. However, unless a species is *very rare*, it will occupy its proper place as the work progresses.



NOTHOCHLÆNA HOOKERII

XIII



Portion of mature Frond, upper side.

NOTHOCHLÆNA HOOKERII.

DESVAUX. KAULFUSS. MOORE AND HOULSTON. KUNZE.
PRESL. SPRENGEL.

PLATE XIII.

Nothochlæna incana,	PRESL.
Notholæna nivea,	R. BROWN. J. SMITH.
Cincinalis nivea,	DESVAUX. FEE.
Pteris nivea,	SWARTZ. SPRENGEL. POIRET.
Acrostichum albidulum,	WILLDENOW. SWARTZ.
" "	SPRENGEL. CAVANILLES.

Nothochlæna—Spurious cloak.	*Hookerii*—Of Hooker.

THERE will be very few handsomer Ferns figured in this work than the *Nothochlæna Hookerii;* it is a tender, delicate, and lovely species, requiring to be cultivated in a stove. When well grown it makes a compact elegant plant, which is strikingly beautiful from the copious snowy-white farinose powder which covers the under side of the fronds, and the beauty is enhanced by the marginal belt of shining sori.

The length of the frond varies from six to twelve inches; usually about ten inches.

The colour of the frond, when first expanded, is a bright green, becoming, when more mature, of a bluish green on the upper side, whilst beneath it is covered with a dense pure white farinose powder.

The form of the frond is bipinnate, with roundish egg-shaped obtuse entire pinnules, which are caudate at the base, the terminal one being lobed. Terminal, and attached to a short creeping rhizoma. The midrib has dispersed sparingly over it small thin scales, and is partially covered with white farinose powder. The colour of the rachis is ebony black, but not polished.

The sori are terminal and linear, becoming confluent, forming a broad marginal dark belt, which is a great contrast to the white farinose powder.

There are two forms of *Nothochlæna Hookerii*, the commoner form is but sparingly scattered over with farinose powder, is more slender, and does not produce so compact a specimen.

Being a delicate Fern, it requires considerable attention in order to cultivate it successfully.

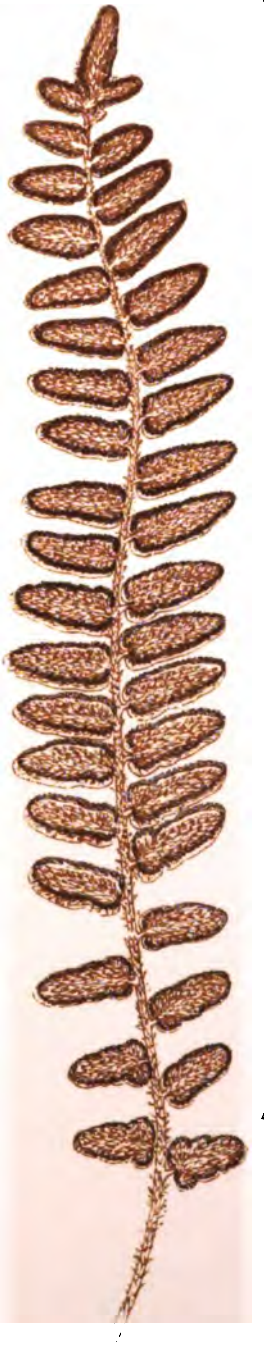
This species is a native of Mexico, Peru, and Chili.

It is included in the Fern Catalogues of Messrs. Backhouse, of York; and Messrs. Booth, of Hamburg.

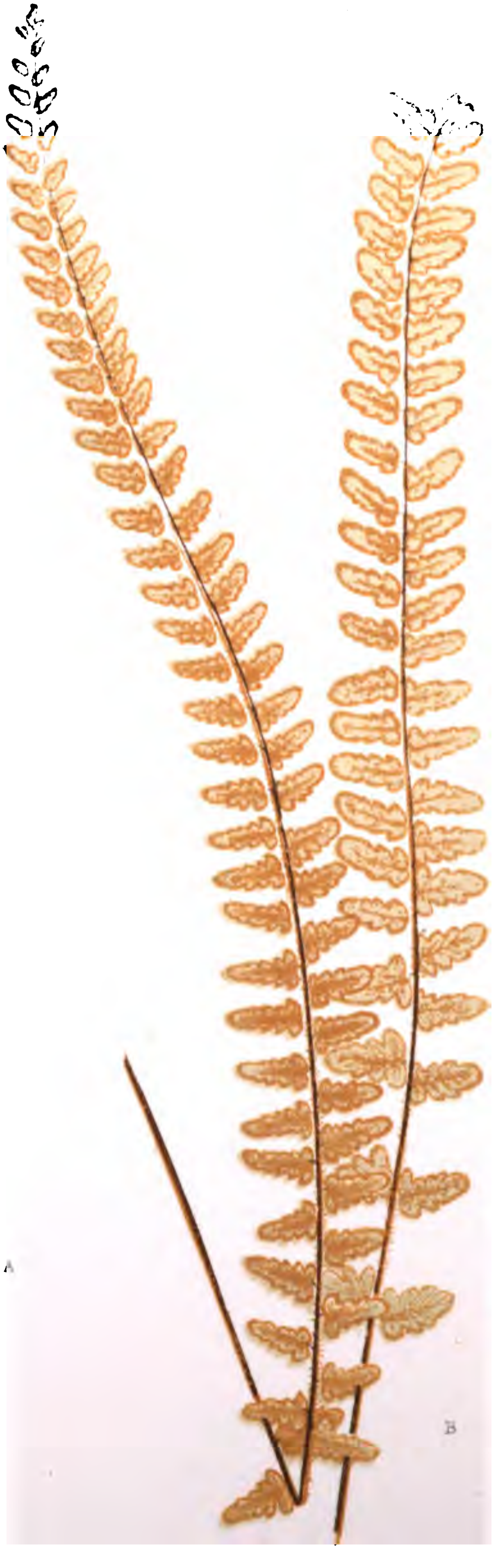
By no means a common Fern in cultivation in Great Britain.

I am indebted to Mr. Hathorn, gardener to Lord Middleton, for the one form of this Fern; and to Messrs. Booth and Sons, Nurserymen, Hamburg, for the more slender variety; and also to Mr. Norman, of Hull; and to Mr. Hathorn, for fructified fronds.

The illustration is from a plant in my own collection. It is the most farinose form of this Fern.

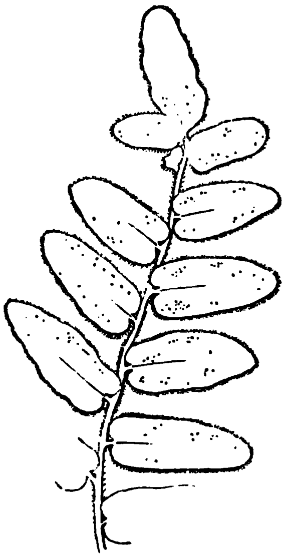


NOTHOCHLÆNA LÆVIS.



N. TRICHOMANES.

XIV



Portion of mature Frond, upper side.

NOTHOCHLÆNA LÆVIS.

MOORE AND HOULSTON.

PLATE XIV.—A.

Nothochlæna—Spurious cloak. *Lævis*—Soft.

THE present species is not common in cultivation; it is an ornamental Fern, and makes a pretty plant.

Usually, the length of the frond is about nine inches, and the width one inch and a quarter; occasionally it exceeds twelve inches in length.

The frond is pinnate, the pinnæ being entire, and attached to the midrib by a short stalk. The frond is of an oblong ovate form, the base being caudate.

On the upper side the frond has dispersed over it stellate pubescence, whilst beneath it is thickly covered with imbricated white scales, which in the mature state become brown.

The sori are linear and terminal, protruding through the scales, and producing a continuous broad black border to the frond.

The rhizoma is creeping, thickly scaly, and of a white colour.

The rachis is also thickly covered with scales of a brownish white colour.

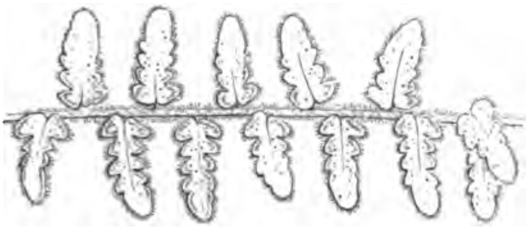
A delicate species requiring care in its cultivation. If the fronds are allowed to remain wet they are soon decayed; indeed this applies to *Nothochlæna nivea*, and most of the other species in this genus. In potting, not only the *Nothochlænas*, but all other Ferns, it is a great advantage to pass the soil through two screens, the one to remove all the finely pulverized soil, and the second all the large lumps; when this is done the soil does not settle down so closely together, nor is it so liable to injure the drainage. It is also very desirable to arrange the Ferns as much together as possible, either under the shade of large stove and greenhouse plants, or to cover the roof of the house with some vigorous climber, such as the *Stephanotus floribundus*, *Echites splendens*, *Solanum jasminoides*, or any of the *Passiflora* tribe. With the exception of the *Nothochlænas* and a few other Ferns, most of the species enjoy a gentle syringing every day.

It is a native of South America—Mexico.

I am not aware that *N. lævis* is as yet included in any of the Nurserymen's Catalogues.

To Mr. Henderson, of Wentworth, my thanks are due for a plant and fronds of this species.

The illustration is from one of Mr. Henderson's fronds.



Portion of mature Frond, upper side.

NOTHOCHLÆNA TRICHOMANOIDES.

R. Brown. Desvaux. Moore and Houlston. Sprengel.

PLATE XIV.—B.

Nothochlæna sinuata,	Kaulfuss.
" *ferruginea,*	Desvaux.
Notholæna trichomanoides,	R. Brown. Presl.
Cincinalis trichomanoides,	Desvaux.
Pteris trichomanoides,	Linnæus. Swartz.
" "	Sprengel. Schkuhr.
Acrostichum pteroides,	Bernhardi.
" *sinuatum,*	Swartz.

Nothochlæna—Spurious cloak. *Trichomanoides*—Trichomanes-like.

The present Fern is a very beautiful species, and is one of the handsomest of the genus.

It is a stove Fern, slender, having a pendulous habit.

The length of the frond is usually about twelve inches; the examples from Wentworth are very fine, some fronds being fifteen inches long, and an inch and a quarter broad.

The colour above is a dull green; beneath it is usually covered with a white farinose powder, and a brown stellate pubescence. The rachis is hairy, and of a reddish brown colour.

The frond is pinnate, the pinnæ being of an oblong-obtuse form, crenate, or bluntly lobed, the base caudate, and auriculate.

Sori terminal, becoming confluent, and forming a continuous linear marginal belt.

Nothochlæna trichomanoides requires considerable care and attention in its cultivation; when well managed it forms a lovely pendulous plant.

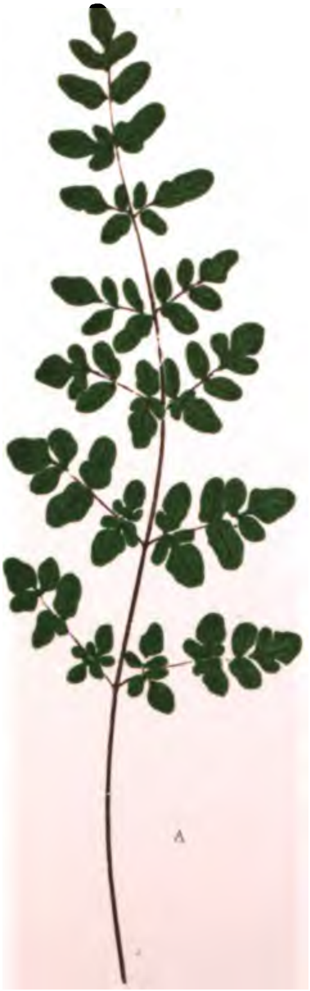
A native of the West Indies—the Island of Jamaica.

Not a common species in cultivation.

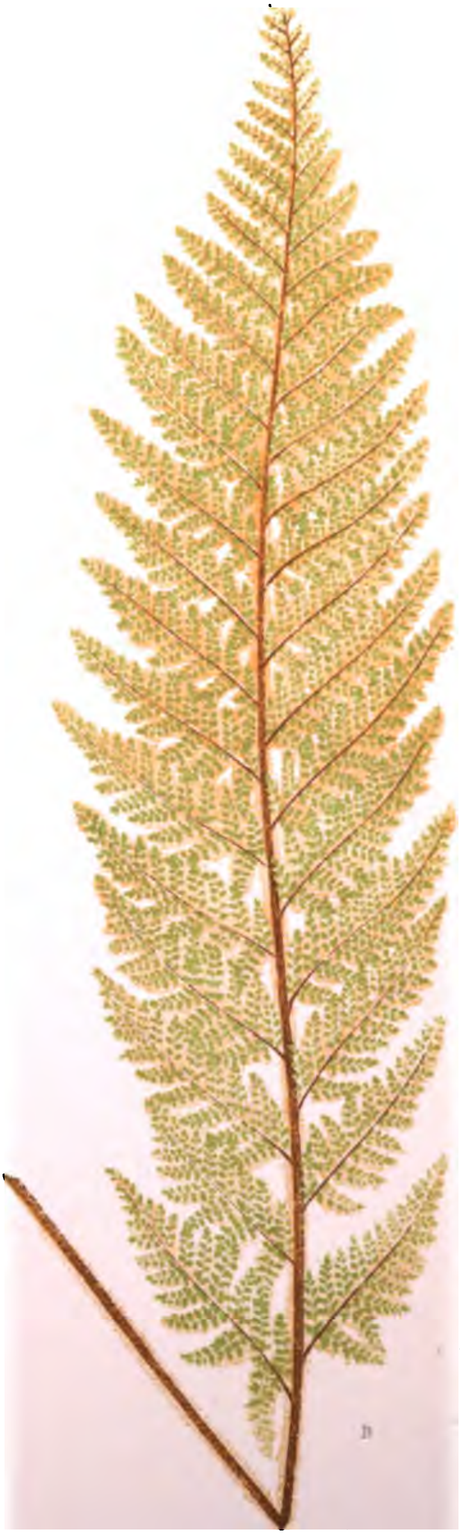
It may be procured of Messrs. A. Henderson, of Pine-apple Place Nursery, and of Messrs. E. G. Henderson, of the Wellington Nursery.

Mr. Henderson, of Wentworth, has obligingly sent me a plant and fructified fronds of this species, and Mr. Norman, of Hull, other fronds.

The illustration is taken from fronds grown in the stove Fernery at Wentworth House.

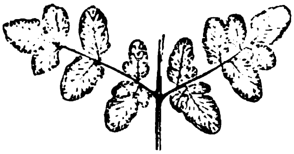


NOTHOCHLÆNA TENERA.



N. TOMENTOSA.

XV



Portion of mature Frond, under side.

NOTHOCHLÆNA TENERA.

HOOKER. SMITH. GILLIES. MOORE AND HOULSTON.
LINK. KUNZE.

PLATE XV.—A.

Cincinalis tenera, FEE.

Nothochlæna—Spurious cloak. *Tenera*—Tender.

THIS species is a great favourite amongst Fern cultivators, having a compact habit, and producing a dwarf yet extremely interesting specimen. It is a tender, delicate, evergreen stove species, but is not difficult to manage by those who are conversant with the growth of Ferns.

The fronds are glabrous, bipinnate, having on the lower pinnæ bluntly-oblong pinnules, cordate-ovate, the superior ones becoming sessile, and the terminal one lobed.

Sori linear, terminal, and continuous, becoming after a time confluent, and then forming a broad dark belt around the margin of the frond, giving it a handsome appearance.

The colour of the frond is bluish green, stipes dark and shining, attached to a short creeping rhizoma; the length of the frond is usually six to eight inches.

In potting this species, care should be taken not to give it

VOL. I. H

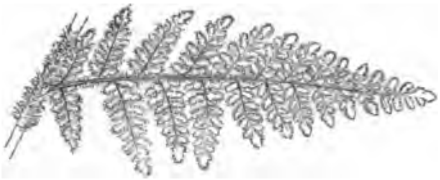
too much room, and this applies to most of the smaller Ferns; they are not so easy to cultivate if over-potted, indeed, no good is gained by giving a plant more room than is absolutely required.

Nothochlæna tenera is a native of Chili.

This Fern is by no means an expensive species. It is in the Catalogues of Mr. R. Sim, of the Nursery, Foot's Cray, Kent; Messrs. Booth, of Hamburg; Mr. E. Cooling, of Derby; Messrs. Rollisson, of Tooting; and Messrs. Backhouse, of York.

I am indebted to Mr. Henderson, of Wentworth; and to Messrs. Rollisson, of Tooting; for plants of this Fern.

The illustration is from a plant in my own collection.



Portion of mature Frond, under side.

NOTHOCHLÆNA TOMENTOSA.

J. SMITH. DESVAUX. MOORE AND HOULSTON. PRESL.

PLATE XV.—B.

Cheilanthes tomentosa, LINK. HOOKER.

Nothochlæna—Spurious cloak. *Tomentosa*—Downy.

ALTHOUGH the present Fern is in all the principal collections in Great Britain, still it is not usually seen anywhere else. It is very handsome, and deserves to be more generally cultivated.

Nothochlæna tomentosa is a delicate evergreen stove Fern, very woolly in appearance, and differing considerably from any of the species yet described.

The fronds are tripinnate, the pinnules being oblong-linear, and having exceedingly small segments, which are roundish, distant, and concave, the terminal one being large in comparison with the others.

The sori are not by any means copious, there being only a few spore-cases on each segment.

In length the fronds are about twelve inches.

The stipes is attached to a short creeping rhizoma.

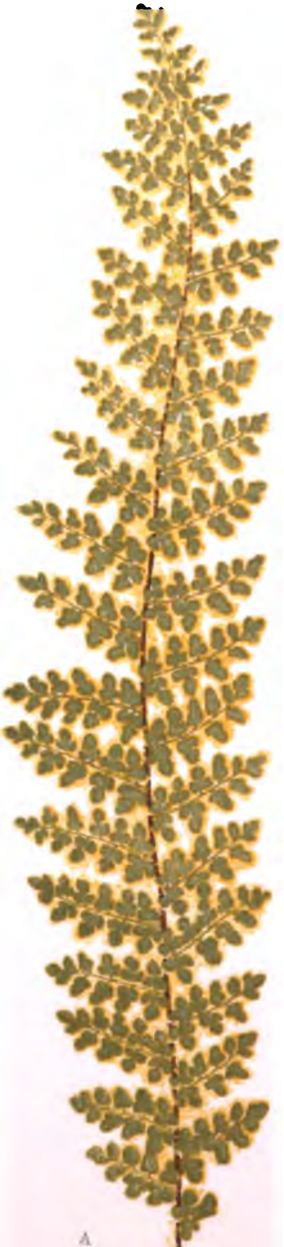
In cultivation it is requisite to use great care in watering, as the moisture is apt to remain on the fronds if they become wet, and when this is the case they soon decay.

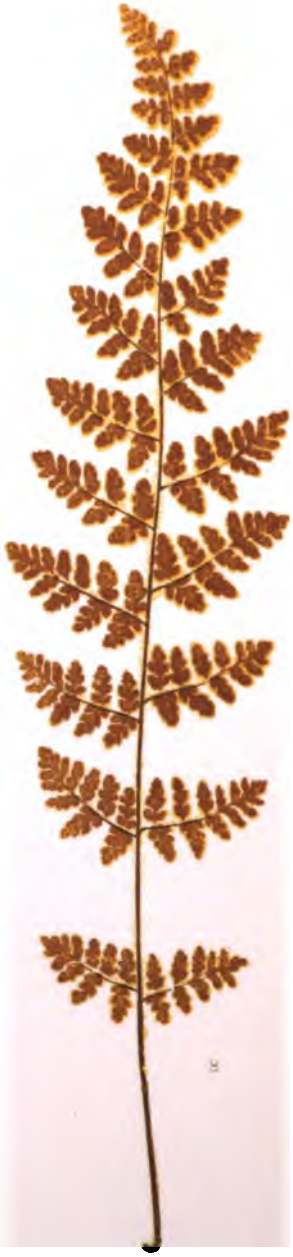
Its native place is Mexico.

As yet, I believe, the *N. tomentosa* is not to be found in any of the Nurserymen's Catalogues.

To Mr. Henderson my thanks are due for a plant of this beautiful Fern.

The illustration is from a frond forwarded by Mr. Henderson, of Wentworth.

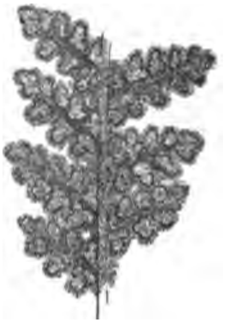




NOTHOCHLÆNA LANUGINOSA.

N. VESTITA.

XVI



Portion of mature Frond, under side.

NOTHOCHLÆNA LANUGINOSA.

Desvaux. Fee. Kunze. J. Smith. Kaulfuss.
Moore and Houlston.

PLATE XVI.—A.

Nothochlæna vellea,	Desvaux.
Notholæna lanuginosa,	Presl.
Cincinalis vellea,	Desvaux.
Acrostichum velleum,	Desvaux. Swartz. Aiton.
" "	Sprengel.
" *catanense,*	Cosent.
" *lanuginosum,*	Schkuhr. Desfontains.
" *maranthæ,*	"Enc. Bot."

Nothochlæna—Spurious cloak.
Lanuginosa—Woolly.

This is a very tender, pretty, delicate species, requiring to be grown in a greenhouse.

The fronds, which are of a heavy green colour above, and brownish beneath, are densely covered with woolly-looking hairs, which extend in every direction beyond the margin of the pinnæ.

In form the frond is linear-lanceolate, bipinnate, having rounded ovate blunt pinnules, the terminal pinnule being lobed.

Usually from four to six inches in length, and about an inch wide; the pinnæ being equal in width, except near the apex, where the pinnules become gradually less and less.

Sori linear, terminal, and when mature, becoming confluent.

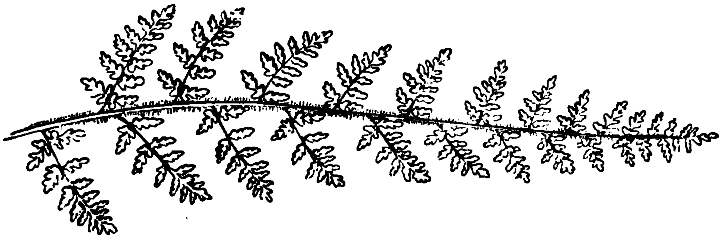
The fronds are attached to a short and somewhat creeping rhizoma.

A native of Northern Africa, Brazil, and South of Europe. Barbary, the Canary Islands, Madeira, Teneriffe, and Sicilia are well-known countries for this Fern.

This is not a common species in cultivation in England; it is, however, in the Catalogues of Messrs. A. Henderson, of the Pine-apple Place Nursery; Mr. Sim, of the Nursery, Foot's Cray, Kent; and Messrs. Booth and Son, of Hamburg.

For plants of this species I am indebted to Mr. Sim, of Foot's Cray, and to Messrs. Booth, of Hamburg.

The illustration is from a frond kindly forwarded to me by Mr. Henderson, gardener to Earl Fitzwilliam.



Portion of barren Frond.

NOTHOCHLÆNA VESTITA.

Desvaux. J. Smith. Kaulfuss. Moore and Houlston.
Loddige.

PLATE XVI.—B.

Cheilanthes vestita,	Kunze. Swartz. Presl. Fee.
" "	Schkuhr. Hooker. Willdenow.
" *lanuginosa,*	Nuttall.
Adiantum vestitum,	Sprengel.
Aspidium lanosum,	Swartz.
Nephrodium lanosum,	Michaux.
Woodsia vestita,	Sprengel.

Nothochlæna—Spurious cloak. *Vestita*—Clothed.

This very pretty, slender, dwarf, *Woodsia*-looking Fern is a desirable species, and probably not uncommon in Ferneries, from the circumstance that formerly it was sold as the English *Woodsia ilvensis.*

The fronds are linear, bipinnate, with nearly circular ovate pinnæ; the pinnules pinnatifid, having a crenate margin.

Length of frond from five to ten inches, being attached to a short creeping rhizoma. Densely covered with hairs, giving the stipes a red appearance.

Sori marginal, terminal, round, eventually becoming confluent.

Nothochlæna vestita is easily cultivated, and only requires the protection of a cool greenhouse.

A native of North America, Texas, Missouri, the Rocky Mountains, California, New Caledonia, and Oregon.

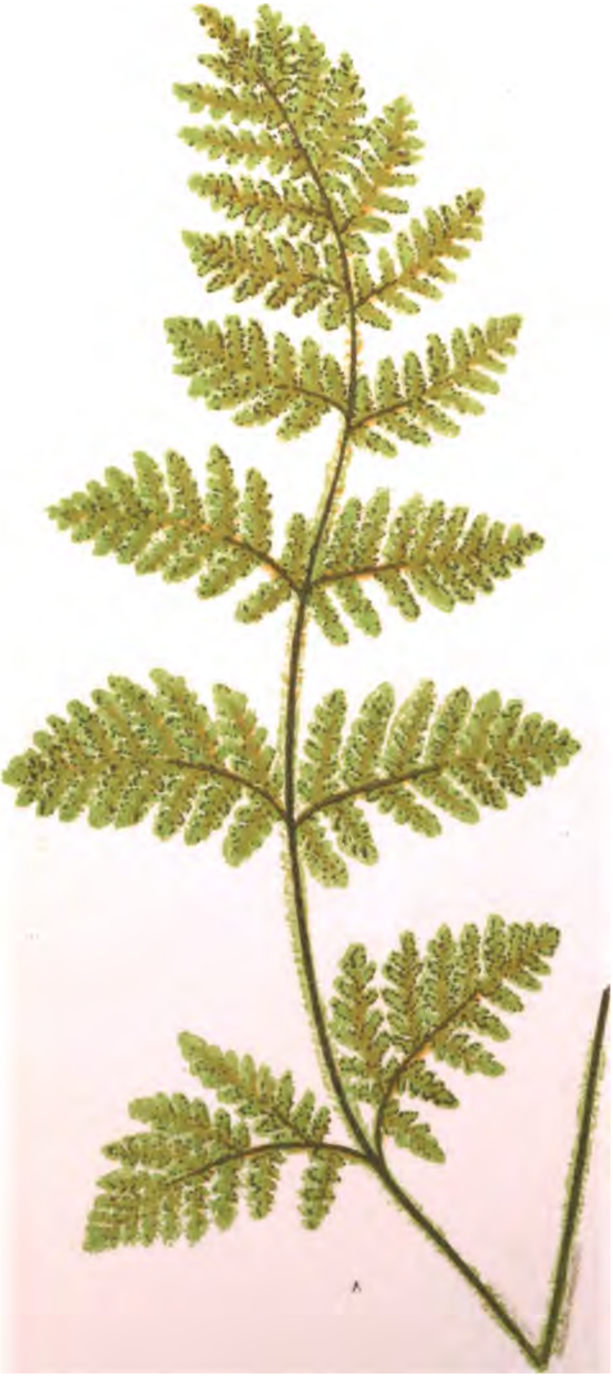
It does not now appear to be a species easily procured, as it is only in the Catalogue of Mr. Sim, of Foot's Cray.

I have not yet been fortunate enough to procure a plant of this species.

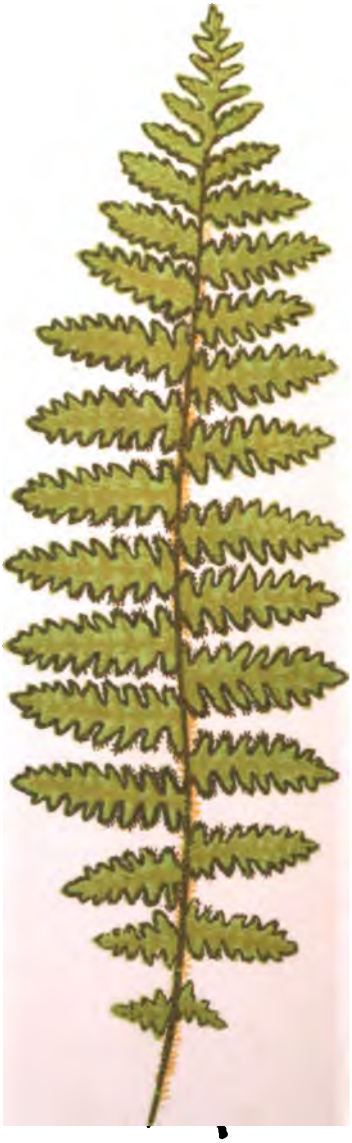
There is a diversity of opinion amongst the principal authorities on Ferns, as to whether this species be a *Nothochlæna* or a *Cheilanthes;* from an examination of the fronds, the former appears to me the genus to which it should be attached.

To Mr. Henderson, of Wentworth; and to Mr. Norman, of Hull, my thanks are due for nicely fructified fronds of this species.

The illustration is from a frond sent by Mr. Henderson, of Wentworth.

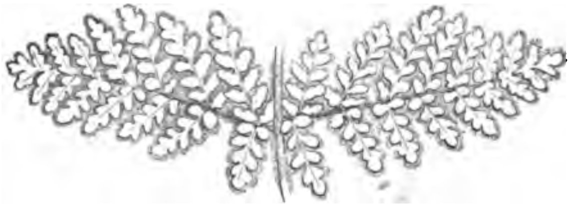


NOTHOCHLÆNA ECKLONIANA.



N. SQUAMOSA.

XVII



Portion of mature Frond, upper side.

NOTHOCHLÆNA ECKLONIANA.

KUNZE. LINK. J. SMITH. FEE. MOORE.

PLATE XVII.—A.

Nothochlæna pumila, H. BEROL.

Nothochlæna—Spurious cloak. *Eckloniana*—Ecklon's.

THIS species is one of the division of the *Nothochlænas* whose fronds are scaly. It is a very handsome Fern, Mr. Moore says "the most beautiful one of the scaly section." *Nothochlæna eckloniana* is scarcely known amongst the Fern growers, being a rare and expensive species, and only to be procured from one or two Nurserymen.

The fronds are entirely covered with narrow white scales, so completely so as to give the plant a woolly appearance. In form they are somewhat egg-shaped, the pinnules bluntly oblong, and the segments nearly ovate, crenate, and concave, revolute margin. Frond tripinnate.

The length of the frond is nearly twelve inches.

Sori terminal. There is a single row of spore-cases on each segment, and these are rather concealed by the margin of the segments being revolute.

It has a creeping rhizoma.

An evergreen Fern, requiring care and attention in order to cultivate it successfully.

A stove species.

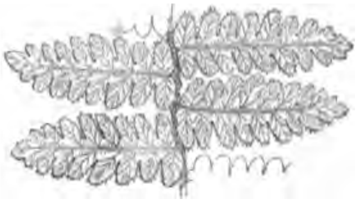
N. eckloniana is an African Fern, growing at the Cape of Good Hope.

First sent to the Royal Botanic Gardens, Kew, in the year 1843, by Mr. D. Cameron.

I am indebted to Messrs. Arthur Henderson and Co., of the Pine-apple Place Nursery, for plants of this species; and to Mr. Henderson, of Wentworth, and to Mr. Norman, of Hull, for fructified fronds.

It will be found in the Fern Catalogues of Messrs. Rollisson, of Tooting; Messrs. Parker, of the Paradise Nursery, Holloway; and in that of Messrs. A. Henderson, of Pine-apple Place.

The illustration is from a frond forwarded to me by Mr. Henderson, of Wentworth.



Portion of mature Frond, upper side.

NOTHOCHLÆNA SQUAMOSA.

LOWE.

PLATE XVII.—B.

Nothochlæna squamata,	MOORE.
“ *gillesii,*	FEE.
Cheilanthes squamosa,	GILLIES. PRESL.
“ “	HOOKER AND GREVILLE.

Nothochlæna—Spurious cloak. *Squamosa*—Scaly.

ALTHOUGH seldom seen in any except the largest collections of Ferns, yet this species deserves to be grown by all who admire the Foreign Filices. It should be cultivated even where only about a score species are grown, for its dwarf habit, the beautiful radiating form of its fronds, and the singular pale colour and woolly appearance of the upper surface, are features to be much admired, and sufficiently so as to render it one of those desirable species where only a few of the more interesting Ferns can be grown.

It was introduced into England about the year 1842.

Fronds pinnate, somewhat egg-shaped, with obtusely-oblong pinnatifid pinnæ, which are alternate; the colour above is a dull green, beneath it is scaly and whitish.

The usual length of the frond is six inches, occasionally they exceed eight inches, and are two inches and a quarter broad.

Sori terminal, extending all round each segment of the pinnæ.

An evergreen stove Fern, growing on rocks.

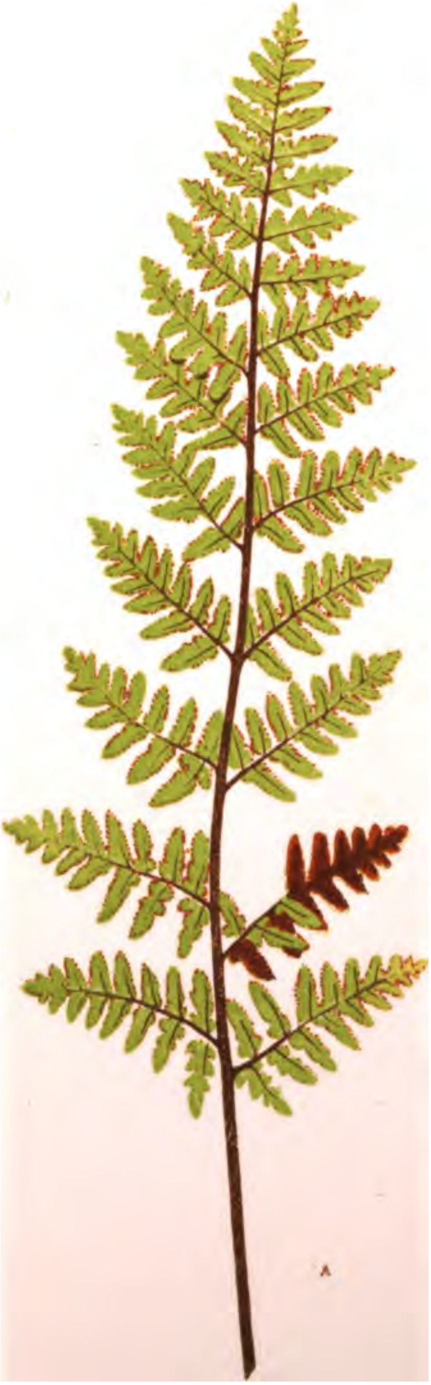
A native of Mexico and Peru. At Cerro del Morro, San Luis, Argentine Republic.

There are from thirty-four to forty pairs of pinnæ; the footstalks of which are so short as to be hid by the base of the pinnæ.

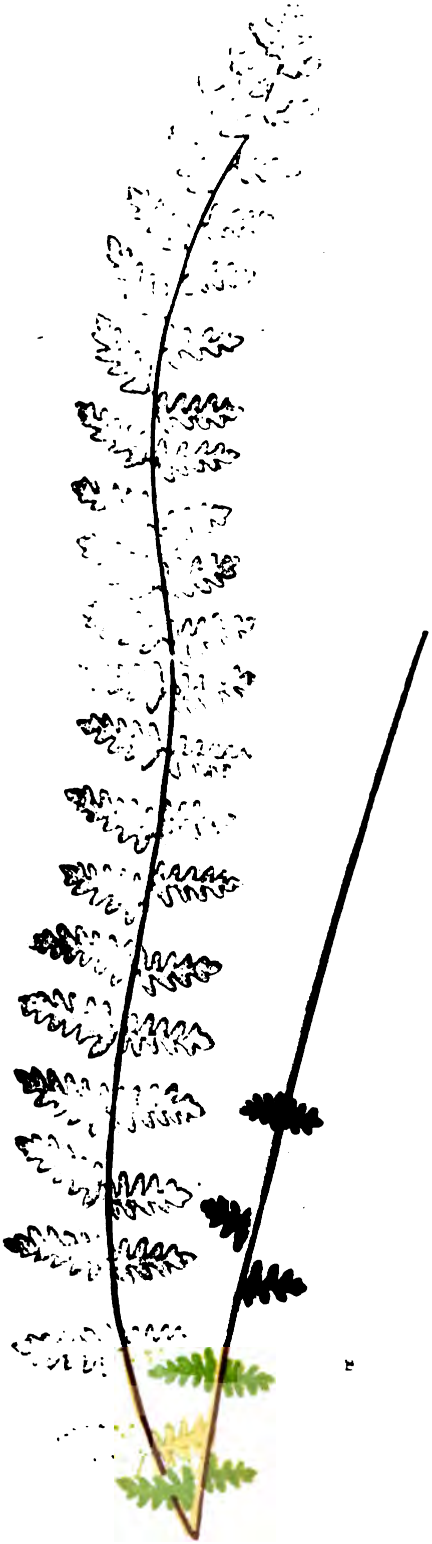
I am indebted to Mr. Henderson, of Wentworth, for a plant of this species, and to the same gentleman, and Mr. Norman, of Hull, for fructified fronds.

It is in the Fern Catalogue of Mr. R. Sim, of the Foot's Cray Nursery, Kent. I am not aware that it is contained in any other British Catalogue.

The illustration is from a plant in my own collection.



NOTHOCHLÆNA MARANTÆ.



N. RUFA.

XVIII

Portion of mature Frond, under side.

NOTHOCHLÆNA MARANTÆ.

R. BROWN. J. SMITH. DESVAUX. FEE.
KAULFUSS. SADLER.

PLATE XVIII.—A.

Notholæna marantæ,	PRESL.
Nothochlæna subcordata,	DESVAUX.
Notochlæna marantæ,	LINK.
Ceterach marantæ,	DE CANDOLLE.
Cincinalis marantæ,	DESVAUX.
" *subcordata,*	DESVAUX.
Acrostichum marantæ,	SCHKUHR. LINNÆUS.
" "	SPRENGEL. WILLDENOW.
" "	LOISELEUR. DESLONGCHAMPS. STURM.
" "	LA PEYROUSE.
" *subcordatum,*	CAVANILLES.
" *canariense,*	WILLDENOW.

Nothochlæna—Spurious cloak. *Marantæ*—Maranta's.

THIS interesting species, so seldom to be met with, even in the larger collections of Ferns, is, nevertheless, a very desirable plant. The rich red-coloured scales of the under side of the frond is a feature so characteristic, that where Ferns are cultivated for their distinctness of character, *Nothochlæna marantæ* should be more frequently grown.

Sprengel, Willdenow, Schkuhr, Linnæus, etc., have considered the present Fern to be an *Acrostichum*, whilst De Candolle places it in the same family with our lovely British *Ceterach officinarum*.

Fronds ovate-lanceolate, bipinnate, blunt oblong pinnules, the lower pinnules stalked, entire at the apex; densely covered beneath with reddish scales, fronds rising out of a short stout creeping rhizoma.

Sori terminal and marginal.

A stiff-growing frond, varying in length from six to ten inches.

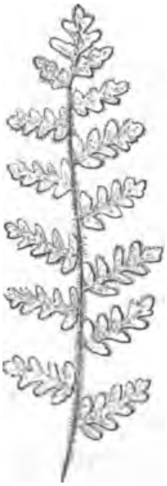
Found in the south of Europe, Madeira, Teneriffe, the Canary Isles, and in Abyssinia.

An evergreen, greenhouse species, easily cultivated.

Mr. Sim, of Foot's Cray Nursery, has been good enough to send me a plant of *N. marantæ*, and I have received excellent fronds from Miss Kingston, of Colwick; Mr. Sim, of Foot's Cray; Mr. James Atkins, of Painswick; and from Mr. Norman, of Hull.

I believe that Mr. Sim, of Foot's Cray, and Messrs. A. Henderson, of Pine-apple Place, are the only English Nurserymen having plants for sale. It is in the Catalogue of Messrs. Booth, of Hamburg.

The illustration is taken from a frond forwarded by Mr. Atkins, of Painswick.



Portion of mature Frond, upper side.

NOTHOCHLÆNA RUFA.

PRESL. MOORE AND HOULSTON. FEE. KUNZE.
J. SMITH.

PLATE XVIII.—B.

Nothochlæna rufa,	PRESL.
Cheilanthes ferruginea,	WILLDENOW. LINK.
" "	SPRENGEL. KAULFUSS.

Nothochlæna—Spurious cloak. *Rufa*—Red.

Nothochlæna rufa is a Fern partaking somewhat of the character and general appearance of *N. trichomanoides.* It is a rare species in cultivation, and not to be procured at the English Nurseries. In habit it is slender, and rather straggling.

A native of the West Indies, South America, American Meridian, Mexico, and Peru.

An evergreen stove Fern, which was received at the Royal Gardens, Kew, in the year 1841, from the Royal Botanic Gardens of Berlin.

N. rufa has narrow fronds, from twelve to eighteen inches long, which are pinnate, the pinnæ being ovate, broadly oblong, pinnatifid, woolly. Stipes and rachis pale brown. The frond is attached to a creeping rhizoma.

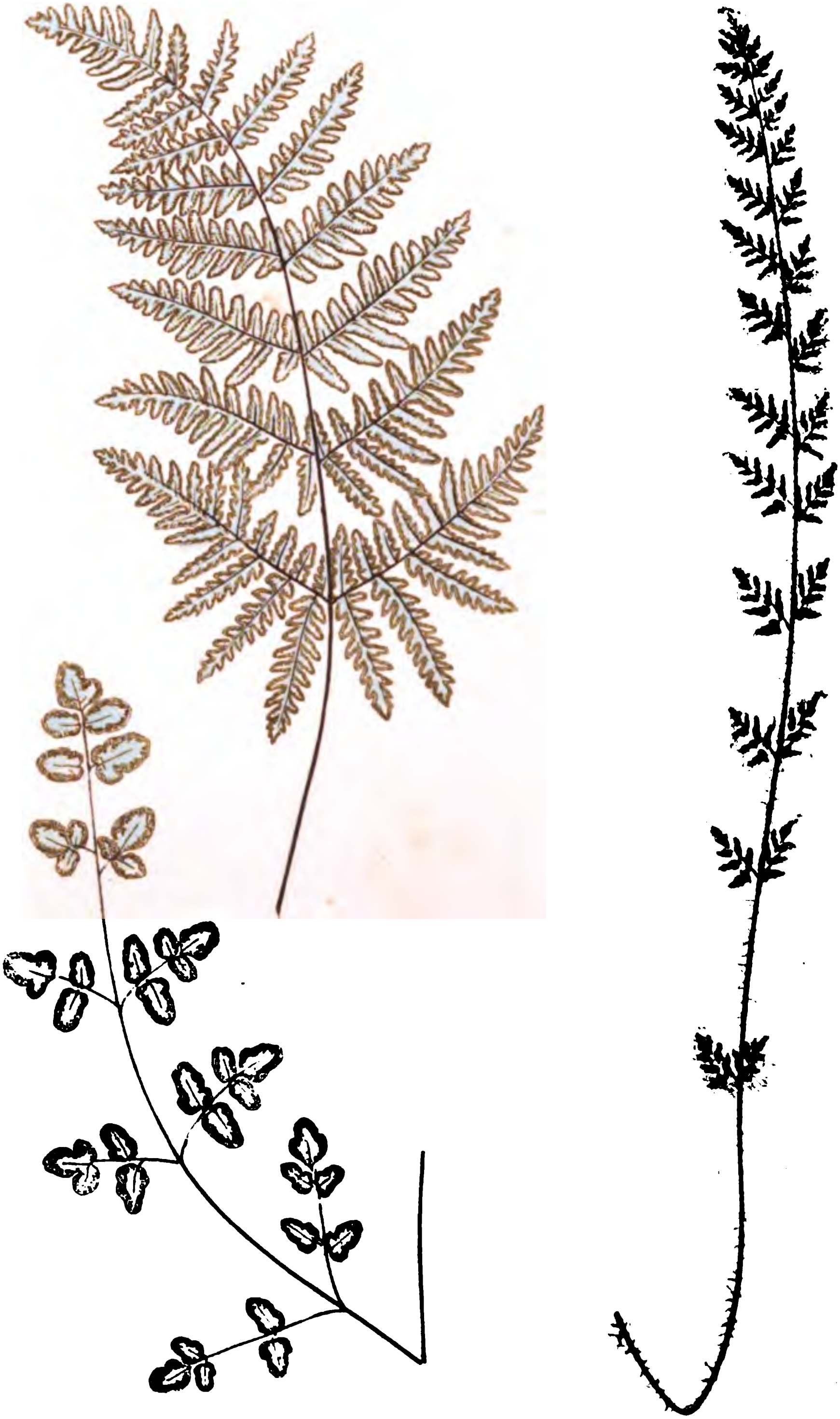
Sori terminal and marginal, forming a line of nearly single spore-cases around the edges of the pinnæ.

Ferns, as with other stove and greenhouse plants, require the houses in which they are grown to be kept at a proper temperature; indeed, many plants are lost from this essential portion of their cultivation being not sufficiently attended to. Every house should be provided with self-registering thermometers, in order to shew how hot in the day-time, and to what degree of cold in the night, the temperature of each house is subjected to; and in speaking of this very important branch of the cultivation of plants, I cannot too strongly recommend the "Horticultural Thermometers" manufactured by Messrs. Negretti and Zambra, of Hatton Garden, London. They are reasonable in price, whilst the scale and stand are both metal, consequently the temperature is always distinctly visible, as the markings cannot be obliterated by the growth over them of confervæ, which is so troublesome an evil with the wooden scales, in damp warm houses.

I have not yet been fortunate enough to procure a plant of *N. rufa.* Since the above has been in type, a plant has been given to the author by Mrs. Delves, of Tunbridge Wells. I am, however, indebted to Sir William Hooker; Mr. Henderson, of Wentworth; and to Mr. Norman, of Hull, for fructified fronds.

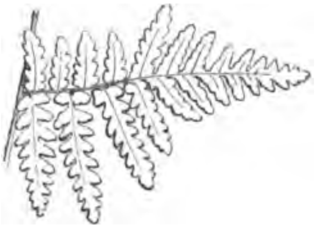
This species does not appear to be in any of the Catalogues of the English Nurserymen; it is in that of Messrs. Booth and Son, of the Hamburg Nursery.

The illustration is from a frond obligingly presented to me by Sir William Hooker, Director of the Royal Gardens, Kew.



NOTHOCHLÆNA NIVEA. N. ARGENTEA. N. DISTANS.

XIX



Portion of mature Frond, upper side.

NOTHOCHLÆNA ARGENTEA.

MOORE AND HOULSTON. HORT.

PLATE XIX.—A.

Allosorus argentea,	PRESL.
Aleuritopteris argentea,	FEE.
Cassebeera argentea,	J. SMITH.
Cheilanthes argentea,	KUNZE.
Pteris argentea,	GMELIN.
“ “	LANGSDORFF AND FISCHER.

Nothochlæna—Spurious cloak. *Argentea*—Silver.

THE above Fern takes its name from the copious snowy-white powder with which the under side of the frond is densely covered. The present species and the *Cheilanthes farinosa* of Hooker, (*Cassebeera farinosa* of Smith,) are undoubtedly the handsomest of the silver Ferns; the fructification occurring only along the edge, the whole interior surface of the pinnæ is covered with white powder, the fructification being, as it were, a dark narrow belt surrounding the white surface. The effect is greater than in the silver Ferns of the *Gymnogrammas*, from the circumstance that in the latter family the seed-vessels are scattered all over the frond.

The *Nothochlæna argentea* appears to be very rare in cultivation in Great Britain, so much so that it is even difficult to procure a frond.

A stove Fern, requiring much care in its cultivation, but the attention given to it is well repaid when the plant becomes a full-grown specimen.

This species is a native of South America and Mexico, and is an evergreen Fern.

The form of the frond is triangularly ovate, sub-bipinnate, the pinnules crenate and oblong-obtuse, the lower pinnules being distant.

The stipes, rachis, and even the midrib of the pinnæ are black and polished. The stipes scaly near the base.

Sori linear and terminal, being composed of a single row of spore-cases round each segment, immediately within the margin.

The fronds rise out of a somewhat creeping rhizoma.

The colour is dull green above, beneath the farinose powder renders it snowy white.

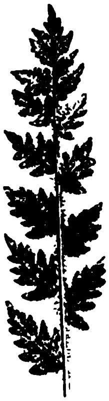
A dwarf species, having somewhat the appearance of a diminutive plant of the *Cheilanthes farinosa* of Hooker, the fronds seldom as much as six inches in length.

The only British Catalogue which includes this Fern, appears to be that of Mr. Sim, of the Foot's Cray Nursery, in Kent.

The only plants which I possess are seedlings, raised in the autumn from spores, and consequently not yet characteristic.

I am indebted to Mr. Henderson, of Wentworth; Mr. Sim, of Foot's Cray; and to Mr. Norman, of Hull, for beautiful fronds of *N. argentea*.

The illustration is from a frond forwarded by Mr. Henderson, of Wentworth.



Portion of mature Frond, upper side.

NOTHOCHLÆNA DISTANS.

R. Brown. Kunze. Kaulfuss? Labill. Moore and Houlston. Fee. J. Smith.

PLATE XIX.—B.

Nothochlæna—Spurious cloak. *Distans*—Distant.

A rare Fern, being seldom met with in our British collections, and consequently a difficult species to procure fronds of. It is a neat interesting Fern, and one which should be more generally cultivated.

Nothochlæna distans is a dwarf evergreen species.

A greenhouse Fern.

New Holland appears to be the only country in which this species has been found.

This *Nothochlæna* was introduced into England in the year 1823, and was raised from spores at the Royal Gardens, Kew, in 1836.

The form of the frond is linear-lanceolate, it is bipinnate, having oblong-obtuse pinnules, opposite, sessile, and hairy.

It is a very scaly Fern, the stipes, rachis, and even the midrib of the pinnæ being covered with scales.

The length of the frond varies from six to ten inches, according to the success of the cultivator.

Adherent to a creeping rhizoma.

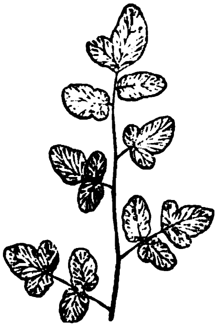
The sori terminal, marginal, and becoming confluent.

As yet I have been unable to procure a plant of this species.

The only Nurseryman's Catalogue in England containing this species seems to be that of Mr. Kennedy, of the Bedford Conservatories, Covent Garden. Abroad, it is in that of Messrs. Booth, of Hamburg.

My thanks are due to Mr. Moore, the Curator of the Botanic Gardens of Chelsea; Mr. Smith, of the Royal Gardens, Kew; and to Mr. Norman, of Hull, for fructified fronds.

The illustration is from a frond forwarded by Mr. Moore, of Chelsea.



Portion of mature Frond, upper side.

NOTHOCHLÆNA NIVEA.

(Continued from Page 84.)

PLATE XIX.—C.

In concluding our present history of the *Nothochlænas*, I have deemed it advisable to figure another form of *N. nivea*, or rather to figure the typical form of this species. This, and the one formerly figured, (Plate XIII.) are both known in gardens under the name of *N. nivea;* I cannot, however, (notwithstanding the high authority to the contrary,) reconcile myself to believe them to be two forms of the same species. Plate XIX.—C. resembles the typical form of *N. nivea*. With regard to Plate XIII., although not uncommonly met with in gardens, it seems to be a dubious species. Through the kindness of Dr. Hooker, I have lately examined the *Nothochlænas* in the Kew Herbarium, yet have failed to find a single frond which in the slightest degree resembles this species. Under these circumstances it appears desirable to place them under different names, and therefore I beg to suggest that Plate XIII. should bear the name of *N. Hookeri*, in honour of a botanist who has done so much for this science, and indeed whose life is devoted

١٩٧٠

to the improvement of our knowledge of the vegetable kingdom. Mr. Henderson, of Wentworth, informs me that Mr. Riley, of Papplewick, first raised the Fern figured in Plate XIII, and from this stock plants were introduced into several of our larger collections.

NOTHOCHLÆNA CRASSIFOLIA.

(Continued from Page 36.)

N. crassifolia of Moore is the *N. lævis* of Martens and Galleotti; and perhaps it would be better to use the latter name instead of the former, as being more universally adopted; *crassifolia* however seems to be a more appropriate name.

NOTHOCHLÆNA TRICHOMANOIDES.

(Continued from Page 38.)

Some authorities divide *N. trichomanoides* from *N. sinuata*, yet they have every appearance of being two forms of the same Fern, and consequently have not been separated in this work. In the latter the pinnæ are larger than in the former. The series of fronds in the Kew Herbarium evidently run the one species into the other.

GENUS III.

NIPHOBOLUS. Kaulfuss.

A small interesting family, whose name is adopted from the fact that the fronds are covered with a somewhat white starry pubescence. Although, to the ordinary observer, the genus has certainly no pretension to the name *Niphobolus*—covered with snow, which would have applied better to a portion of the species of *Gymnogramma* or *Nothochlæna*, still, when examined with a magnifying glass, the fronds are observed to be scattered over with snow-like crystals; hence the name is a very appropriate one.

We have no British representative of this family.

The fronds are all simple, that is, they are not divided; the veins, which are pinnate, are internal and almost invisible; the venules are parallel, anastomosing transversely, and producing from two to five irregular, excurrent, free veinlets, which, at the apex, are soriferous.

There are both barren and fertile fronds; the latter contracted, and in some species much longer than the barren fronds. The length of the frond varies from that of an inch to nearly two feet, being attached to a creeping or cæspitose caudex. In habit this genus may be said to more closely resemble that of the mosses, than the ordinary character of the Fern tribe. The fronds are thick and fleshy. In order to observe the venation it is requisite to remove the cellular tissue of the leaf.

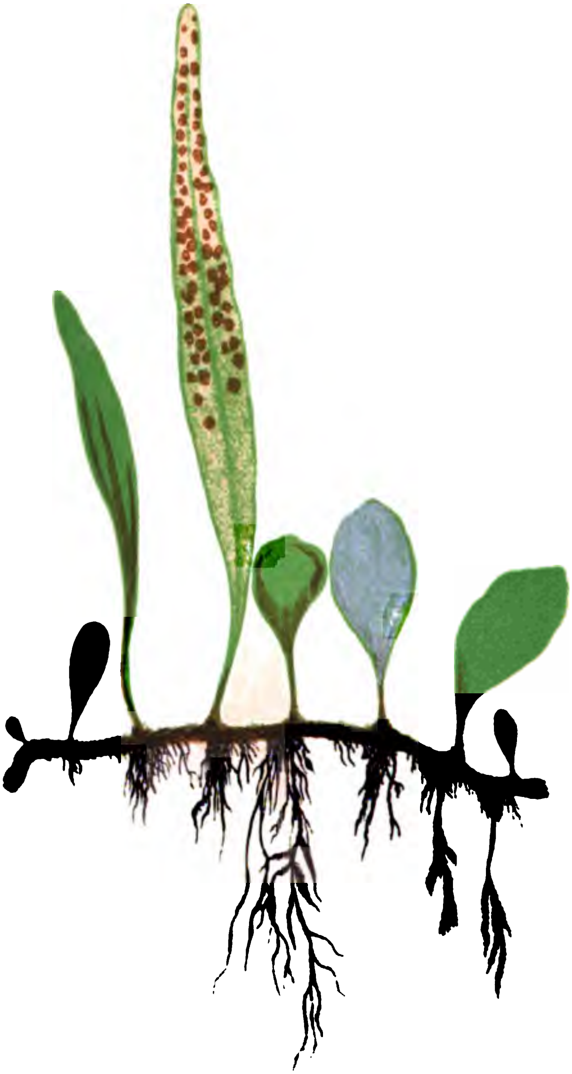
The sori are round, terminal, and eventually become confluent, protruding through the stellated pubescence.

The chief characters of distinction from other branches of the *Polypodieæ* are the thick and stellated pubescence, or scales, which are found chiefly on the soriferous part of the frond; and this is more especially to be noticed on account of the fleshy thick frond preventing the venation being seen.

Fee, in his "Genera Filicum," gives a list of twenty-five species, namely,—

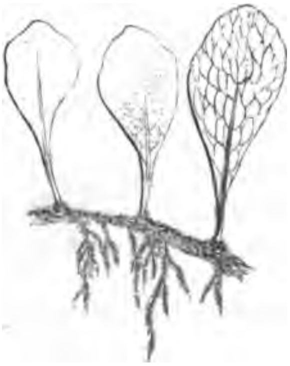
Niphobolus	carnosus,	*Blume.*
"	adnascens,	*Fee.*
"	elongatus,	*Blume.*
"	varius,	*Kaulfuss.*
"	pertusus,	*Sprengel.*
"	caudatus,	*Kaulfuss.*
"	spissus,	*Kaulfuss.*
"	rupestris,	*Sprengel.*
"	bicolor,	*Hooker.*
"	glaber,	*Blume.*
"	puberulus,	*Blume.*
"	albicans,	*Blume.*
"	flocciger,	*Blume.*
"	obovatus,	*Kunze.*
"	nummulariæfolius,	*Smith.*
"	rotundifolius,	*Fee.*
"	Scytopteris,	*Fee.*
"	acrostichoides,	*Smith.*
"	lingua,	*Sprengel.*
"	Penangianus,	*Hooker.*
"	hastatus,	*Kunze.*
"	costatus,	*Presl.*
"	Africanus,	*Kunze.*
"	Samarensis,	*Fee.*
"	fissus,	*Blume.*
"	neglectus,	*Fee.*

Of these, Mr. Smith mentions in his "Genera of Ferns," that *N. varius* was received at Kew, in 1845, and *N. costatus* in 1825; I am not, however, aware that they are now in the Kew Collection, and it seems doubtful whether any besides the three here figured are cultivated in England.



NIPHOBOLUS RUPESTRIS.

XX



Portion of rhizoma, with barren Fronds.

NIPHOBOLUS RUPESTRIS.

Sprengel. Moore and Houlston. Hooker and Greville.
Kunze. Presl. Smith. Fee.

PLATE XX.

Niphobolus serpens,	Endlicher.
Craspedaria rupestris,	Link.
Polypodium rupestre,	R. Brown. Forster.

Niphobolus—Covered with snow. *Rupestris*—A rock.

This is a curious diminutive Fern, with somewhat balloon-shaped fronds.

An evergreen greenhouse species, growing upon rocks.

A native of New Holland and Australia.

The sterile and fertile fronds are very different in form and size. The sterile ones are roundish ovate, being decurrent at the base; whilst the fertile fronds are linear, being blunt at the apex, and decurrent also at the base. Both forms of frond are simple; the colour of each above a dull green, and in substance thick and fleshy in appearance; beneath the frond is whitish.

The length of a sterile frond varies from one to two inches, and of a fertile frond from three to four inches.

The fronds rise out of a creeping rhizoma, which is covered with reddish scales.

Sori round, in about two irregular rows on each side of the midrib, are confined to the upper half of the frond.

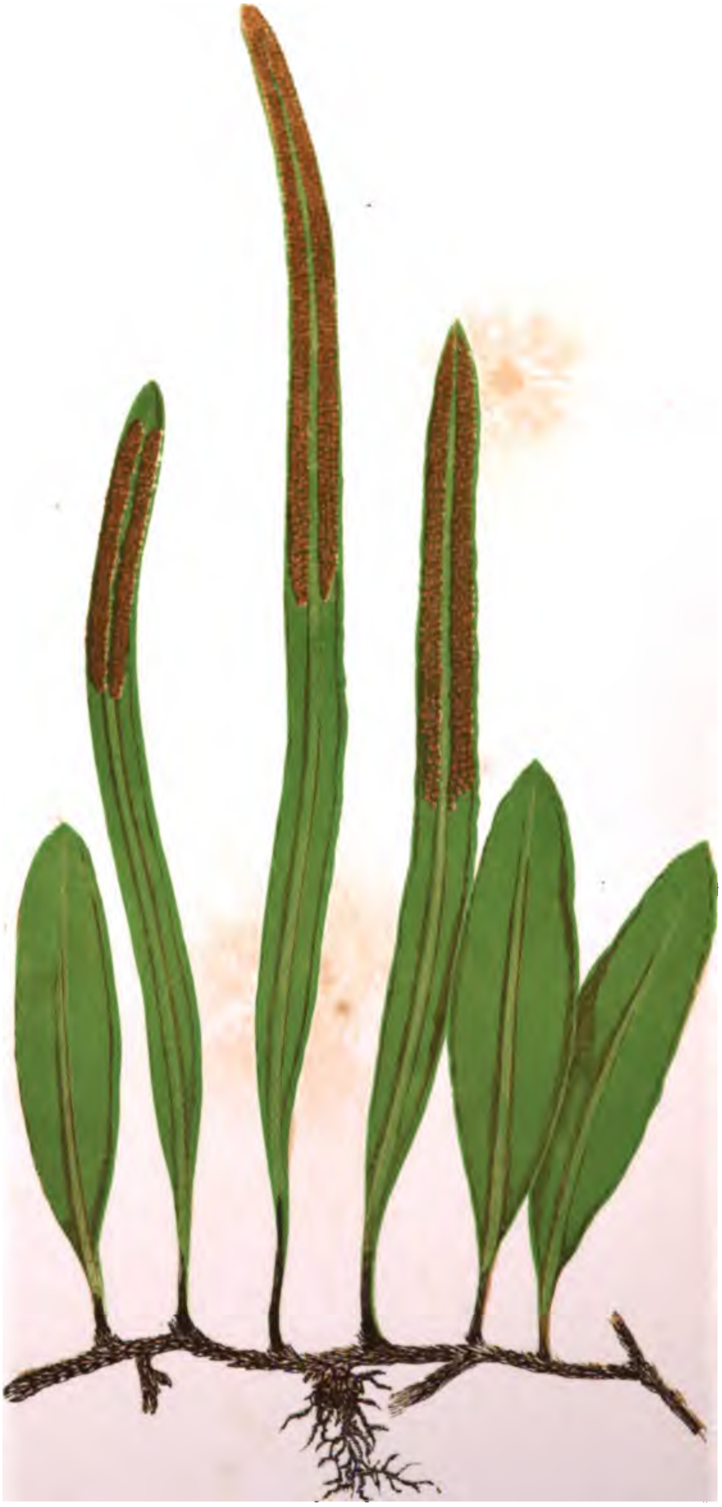
The veins and costa, being buried within the frond, are almost invisible.

The star-like pubescence is not so plainly visible as in the next species.

I am indebted to the Curator of the Cambridge Botanic Gardens, and to Mr. Henderson, of Wentworth, for plants; and to the latter gentleman; Mr. Sim, of Foot's Cray; and Mr. Norman, of Hull, for fronds.

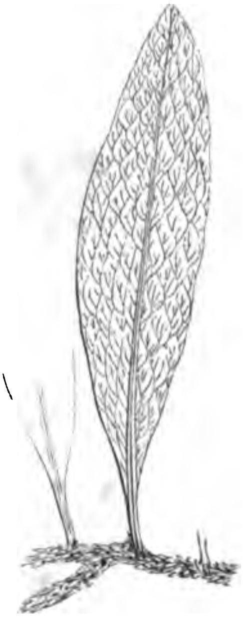
The following Nurserymen include this species in their Catalogues:—Booth, of Hamburg; Rollisson, of Tooting; A. Henderson, of Pine-apple Place; Masters, of Canterbury; Veitch, Jun., of Chelsea; Sim, of Foot's Cray; and Parker, of Holloway.

The frond for illustration was procured from Mr. Henderson, of Wentworth.



NIPHOBOLUS PERTUSUS.

XXI



Portion of rhizoma, with a barren Frond, upper side.

NIPHOBOLUS PERTUSUS.

SPRENGEL. HOOKER AND GREVILLE. PRESL. KUNZE. SMITH. FEE. MOORE AND HOULSTON.

PLATE XXI.

Craspedaria pertusa,	LINK.
Polypodium pertusum,	ROXBURGH. HOOKER.
Niphobolus varius?	KAULFUSS. BLUME.

Niphobolus—Covered with snow. *Pertusus*—Bored.

ANOTHER curious dwarf Fern, yet not nearly so diminutive as the *Niphobolus rupestris;* the dark, shining green fronds contrast greatly in colour with the generality of the Fern tribe. It is a species easily to be procured from Nurserymen, and one well worthy of cultivation, as its dwarf habit enables it to be grown underneath the larger Ferns.

This species has been cultivated at the Royal Gardens, Kew, since the year 1823.

It is a native of the East Indies, China, Japan, and the Island of Java.

A much more fleshy-looking Fern than *N. rupestris*.

An evergreen stove species.

Both barren and fruitful fronds are of a shining green colour.

Sterile frond oblong-ovate, obtuse, being decurrent at the base; fertile frond linear, and also decurrent at the base.

Length of sterile frond from three to four inches, of fertile frond from four to eight inches; attached to a creeping scaly rhizoma.

About three rows of sori, which eventually become confluent. The sori reddish in colour, and confined to the upper half of the frond; the midrib is generally seen as a green belt between the two rows of sori.

The veins and costa, being immersed within the frond, are almost invisible.

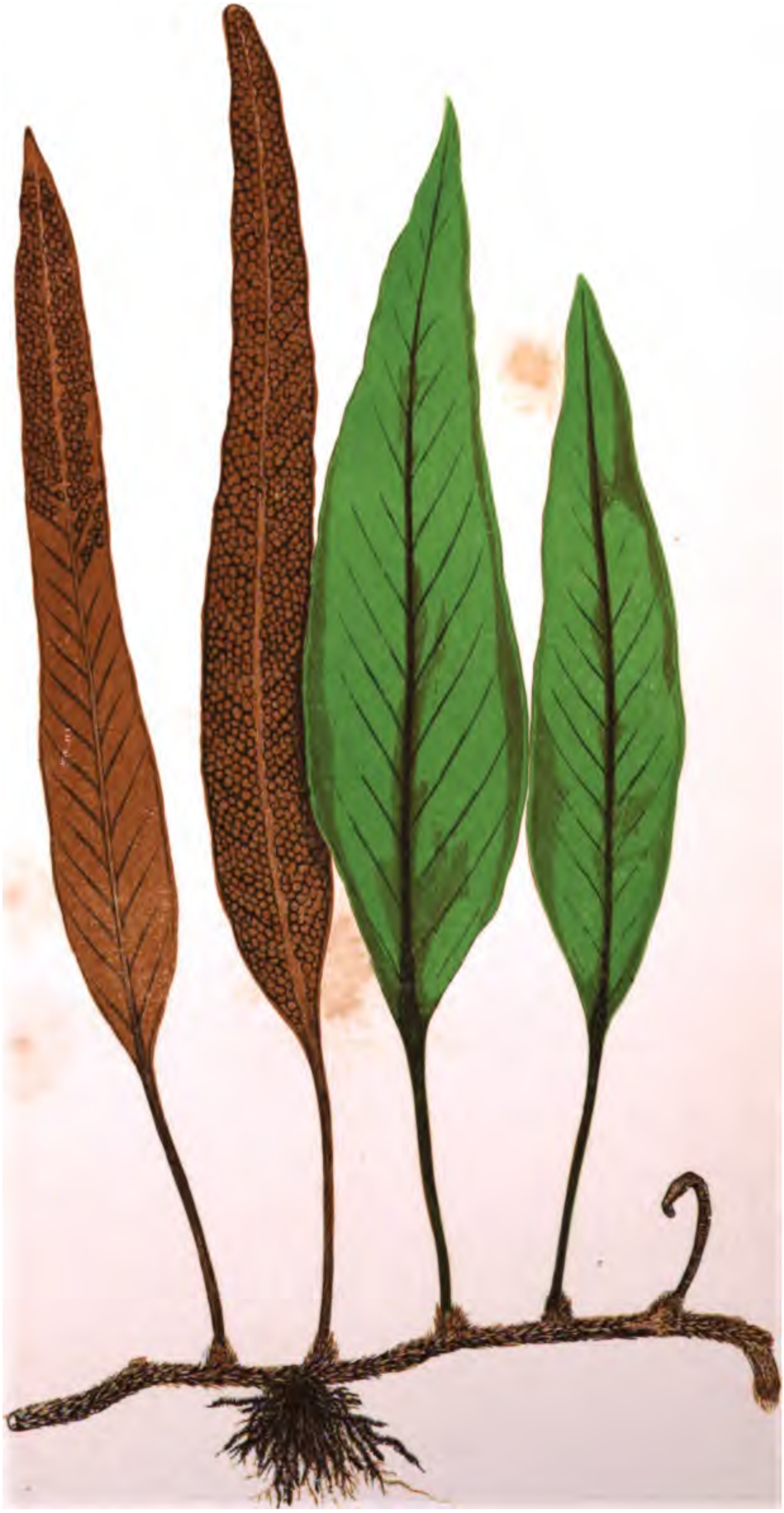
The starry pubescence is very apparent on the shining smooth fronds of this species, giving it the look of being covered with snow-crystals.

Plants have been received from Mr. Henderson, of Wentworth, and from Messrs. Booth, of Hamburg; and fronds from the former gentleman, and Mr. Sim, of Foot's Cray.

It is in the following Nurserymen's Catalogues:—Booth, of Hamburg; Rollisson, of Tooting; Masters, of Canterbury; A. Henderson, of Pine-apple Place; Veitch, Jun., of Chelsea; Osborn and Sons, of Fulham; and Sim, of Foot's Cray.

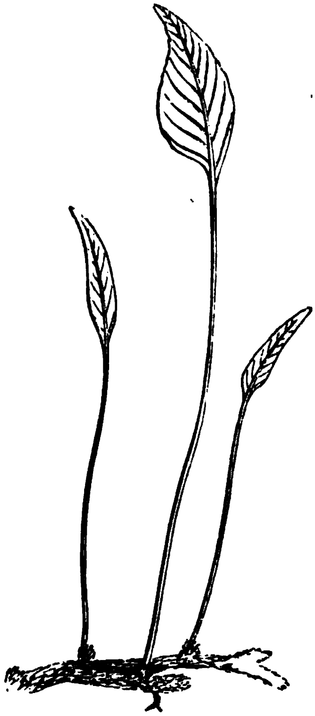
This and the last succeed best if planted among moss in shallow wire baskets.

The illustration is from a frond received from Mr. Sim, of Foot's Cray.



NIPHOBOLUS LINGUA.

XXII



Young Fronds, reduced size.

NIPHOBOLUS LINGUA.

Sprengel. Moore and Houlston. Kunze.
Smith. Fee. Thunberg.

PLATE XXII.

Niphobolus chinensis,	Link.
" *sinensis,*	Loudon.
" *albicans?*	Blume. Presl.
Polypodium lingua,	Thunberg. Langsdorff & Fischer. Kunze.
Craspedaria chinensis,	Link.
Acrostichum lingua,	Thunberg. Schkuhr.

Niphobolus—Covered with snow. *Lingua*—Tongue-like.

This is a very distinct Fern from any other species, and as such should be extensively cultivated. It is easily procured from Nurseries at a reasonable price. The fertile fronds especially are very handsome.

Niphobolus lingua appears to have been introduced into England in 1817, yet it was not in the collection at the Royal Gardens, Kew, until 1830, when Messrs. Loddiges introduced it there.

A stove evergreen species.

Found in China and Japan.

Sterile frond of a lanceolate-acuminate form, decurrent at the base, colour a heavy dark green above, and the surface scattered over with a star-like pubescence, which, when magnified, looks as if a shower of snow had fallen on the leaf; under surface covered with a bronze-like pubescence, giving it a singular brownish look. The fertile frond contracted, but nearly similar in form to the sterile frond. The length of both is about equal, usually from six to ten inches. Articulated on a scaly creeping rhizoma; young fronds whitish; stem covered with a reddish pubescence.

The sori are arranged in transverse parallel rows between the primary veins, and covering the whole of the under side of the frond; colour reddish brown.

Costa raised; veins immersed.

My thanks are due to Mr. Jackson, gardener to Lord Scarsdale, for plants of this Fern; and to the same cultivator; Mr. Henderson, of Wentworth; Messrs. Booth, of Hamburg; Mr. Sim, of Foot's Cray; and to Mr. Norman, of Hull, for fronds.

Not an uncommon Fern, the following Nurserymen keeping it:—Booth, of Hamburg; Rollisson, of Tooting; A. Henderson, of Pine-apple Place; E. G. Henderson, of St. John's Wood; Sim, of Foot's Cray; Veitch, Jun., of Chelsea; Masters, of Canterbury; Osborn and Sons, of Fulham; Kennedy, of Covent Garden; and Parker, of Holloway.

The frond for illustration was forwarded by Mr. Henderson, of Wentworth.

GENUS IV.

POLYPODIUM. LINNÆUS.

THIS exceedingly numerous family has been considerably divided by some of our principal authorities, and indeed a portion of these divisions contain many species. Kunze, however, in his "Index Filicum," has retained the name of *Polypodium*, preferring to place the different groups in sections to that of removing them entirely from *Polypodium*. In the present history it has seemed desirable to follow the example of Kunze in this respect, as being less likely to cause confusion and bewilderment with those growers who may be said to be as yet beginners in this charming study.

The following sections will therefore be described under the head of *Polypodium*:—

Goniopteris
Goniophlebium
Cyrtophlebium
Phlebodium
Drynaria

In Smith's "Genera of Ferns" there are even subdivisions, the true form of *Polypodium* being divided into *Ctenopteris* and *Phegopteris*, in the latter division of which we have several British examples; *Goniophlebium* (which is the *Marginaria* of Presl) into four divisions, namely, *Lopholepis*, *Lepicystis*, *Schellolepis*, and *Goniophlebiæ-veræ*. *Cyrtophlebium* (the *Campyloneurum* of Presl) and *Goniopteris* he has not divided; the *Phlebodium* (the *Pleopeltis* of Presl) into *Phlebodium verum* and *Pleopeltis;* and the *Drynaria* (the *Anaxetum* of Schott, the *Microsorum* of Link, the *Dipteris* of Reinw, and the *Phymatodes* of Presl) into three divisions, namely, *Phymatodes*, *Dipteris*, and *Drynaria vera*.

Fee, in his "Genera Filicum," has given as distinct families

Polypodium
Phegopteris
Goniopteris
Goniophlebium
Campylonevron
Craspedaria
Chrysopteris
Drynaria
Pleuridium

and one or two smaller families.

Under the name *Pleuridium* Fee places *Polypodium crassifolium* and *P. rupestre*. *Chrysopteris* is the *Phlebodium* of authors, and the *Euphlebodium* of Klotzsch; *Craspedaria* is the *Lopholepis* of Smith; and *Campylonevron* the *Cyrtophlebium* of authors.

Moore, in his "Genera and Species of Cultivated Ferns," divides them thus:—

Polypodium
Meniscium
Goniopteris
Goniophlebium
Cyrtophlebium
Phlebodium
Drynaria

The latter of which he subdivides into *Phyllitidis*, *Phymatodes*, and *Drynaria-veræ*.

Link, in his "Filicum Species," divides them thus:—

Craspedaria
Marginaria
Pleopeltis
Chrysopteris
Campyloneurum
Anaxetum
Polypodium
Goniopteris

In *Craspedaria* he includes as a section the genus *Niphobolus*. Kaulfuss, in his "Enumeratio Filicum," does not separate the different sections, adopting the plan of Kunze.

Presl, in his "Tantamen Pteridographiæ," arranges the *Polypodiums* in the following manner:—

Polypodium
Goniopteris
Pleocnemia
Amblia
Goniophlebium
Marginaria
Campyloneurum
Pleopeltis
Dictyopteris
Phymatodes

Of these he subdivides *Polypodium* into *Ctenopteris* and *Phegopteris; Marginaria* into *Pleurogonium* and *Marginaria; Phymatodes* into *Euphymatodes*, *Pleuridium*, and *Drynaria*.

Presl's genus *Pleocnemia* is confined to the *Polypodium leuceanum* of Gaudich, and his *Amblia* to the *P. juglandifolium* of Humboldt; whilst his *Dictyopteris* contains only the *P. attenuatum* of Brown, the *P. macrodon* of Reinw, the *P. pteroides* of Presl, and the *P. irregulare* of Presl.

POLYPODIUM. Linnæus.

The true *Polypodium* has its veins simple, forked, or pinnate, and free. The sporangia is terminal or lateral, in some cases being above the frond, and in others immersed.

The sori mostly circular, transverse, uniserial, solitary or irregular.

The rhizoma creeping, and in some examples cœspitose.

There is a great diversity of size, form, and habit.

According to Mr. Smith, there are about a hundred true *Polypodiums* scattered over the world.

GONIOPTERIS. PRESL.

THE veins are costœform, pinnate, the lower pinnæ anastomosing angularly.

The sporangia is medial or costal.

Sori circular, usually placed on or near the middle of the venules, or basal, or subterminal. Rhizoma creeping.

The Ferns known under the name of *Goniopteris* are mostly analogous to the *Aspidiums* in habit, in the venation, and in the form and position of the sori. The *Aspidium* differs only in having a special indusium.

GONIOPHLEBIUM. PRESL.

THE veins are forked, or costœform, and pinnate, except the lower exterior venule, which is free; the venules anastomose angularly.

The sporangia is terminal.

The sori circular, arranged in one or more transverse parallel rows. Rhizoma creeping.

Distinguished from *Goniopteris* by the sori being produced on the apex of the lower venule, or upon the excurrent free veinlets, which terminate in the areoles.

CYRTOPHLEBIUM. R. BROWN.

THE veins are forked or costœform and pinnate; the lower exterior venule (of each fascicle) free and fertile, the remainder arcuately or angularly anastomosing.

Sporangia lateral or terminal.

Sori round, naked, arranged in two rows between and parallel with the veins, or irregular.

Distinguished from *Goniophlebium* by having smooth fronds and distinct sori.

PHLEBODIUM. R. Brown.

The veins are pinnate or branched, the venules arcuately or angularly anastomosing, forming on their angular meetings or exterior side two veinlets, which are sporangiferous where the two veinlets join.

Sori round or oval, transversely uniserial, or multiserial.

Differing from *Goniophlebium* by having the lower venules combined, the sori being formed at the apex or point of junction.

DRYNARIA. Bory.

The veins are mostly costœform, parallel, or flexuose; venules compound anastomosing.

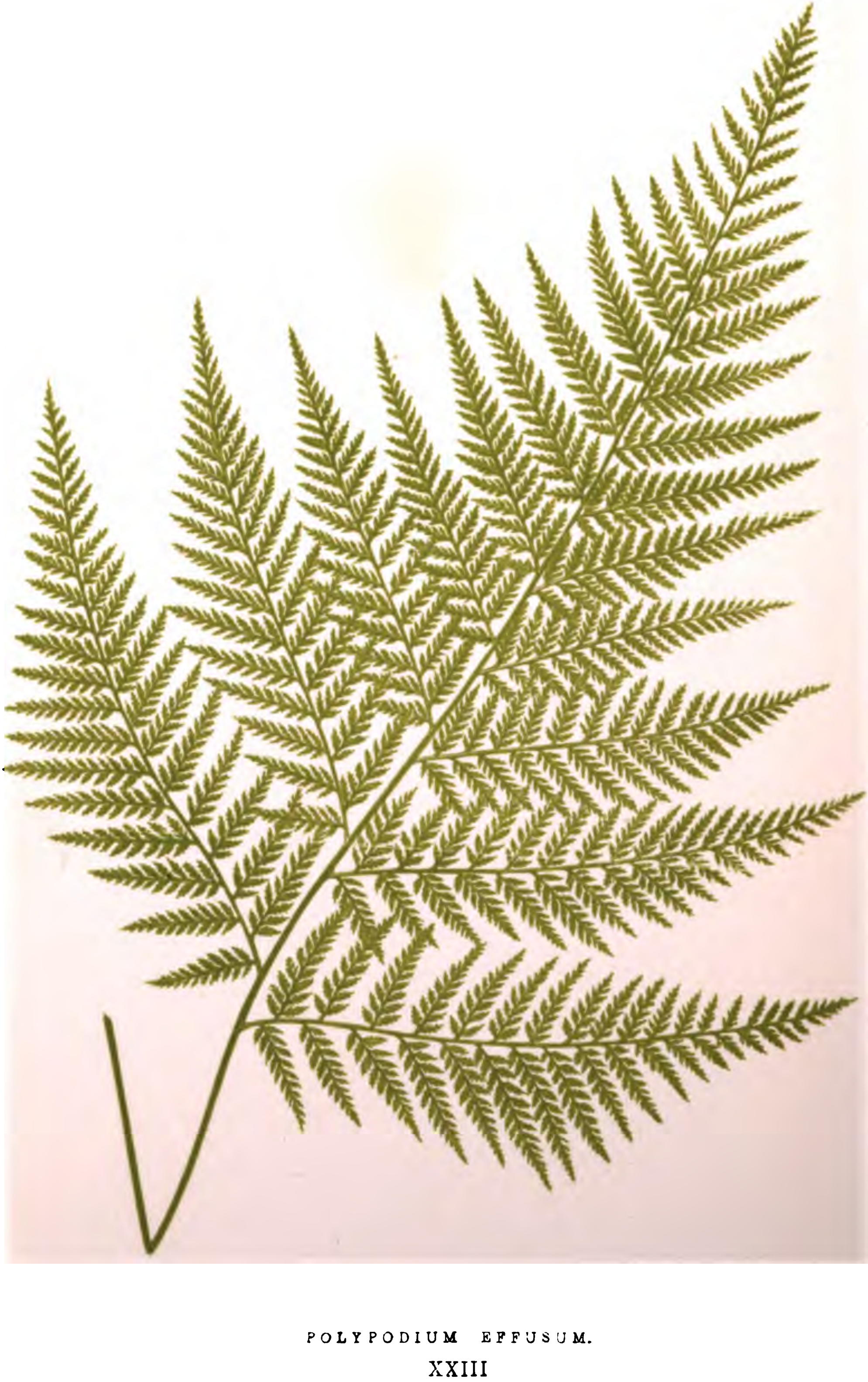
The sporangia is produced on the angles or points of confluence of numerous veinlets.

Sori circular or oblong; transversely uniserial, or in one or two oblique rows between each pair of primary veins, or irregular. Sori forming protuberances on the upper or superior side of the frond.

The frond smooth and thick.

Differing from *Phlebodium* by the venation being more compound, and by the sori being situated where a number of venules join.

The British representatives of this genus are *Polypodium vulgare, P. phegopteris, P. alpestre, P. dryopteris,* and *P. calcareum.* Perhaps the North American *P. hexagonopterum* of Michaux may eventually be added to this list.



POLYPODIUM EFFUSUM.

XXIII

Portion of mature Frond, under side.

POLYPODIUM EFFUSUM.

SWARTZ. KUNZE. PRESL. LINK. WILLDENOW. SCHKUHR.
J. SMITH. MOORE AND HOULSTON.

PLATE XXIII.

Polypodium splendida,	KAULFUSS.
Phegopteris effusa,	FEE.
Adiantum effusum,	SLOAN.

Polypodium—Polypody.	*Effusum*—Spreading.

THERE are so many beautiful Ferns that it is consequently a difficult task which species to recommend most strongly to the notice of cultivators; and indeed to do justice to them, it must be said that the beautiful largely predominate over those that are less interesting in an ornamental point of view. The frond of the present species closely resembles a handsome broad spreading green feather in general appearance, and is capable of being made, under successful cultivation, a splendid exhibition plant.

Polypodium effusum was introduced into this country in the year 1769.

A Jamaica Fern.

An evergreen stove species, requiring abundance of pot-room.

The fronds, which are membranous, glabrous, and of a light green colour, are in form deltoid, four times pinnate, the pinnæ being lanceolate in shape, and the pinnules linear-lanceolate. The segments are pinnatifid, the lower ones being widely apart; the veins of the frond pinnately forked.

Sori round and medial.

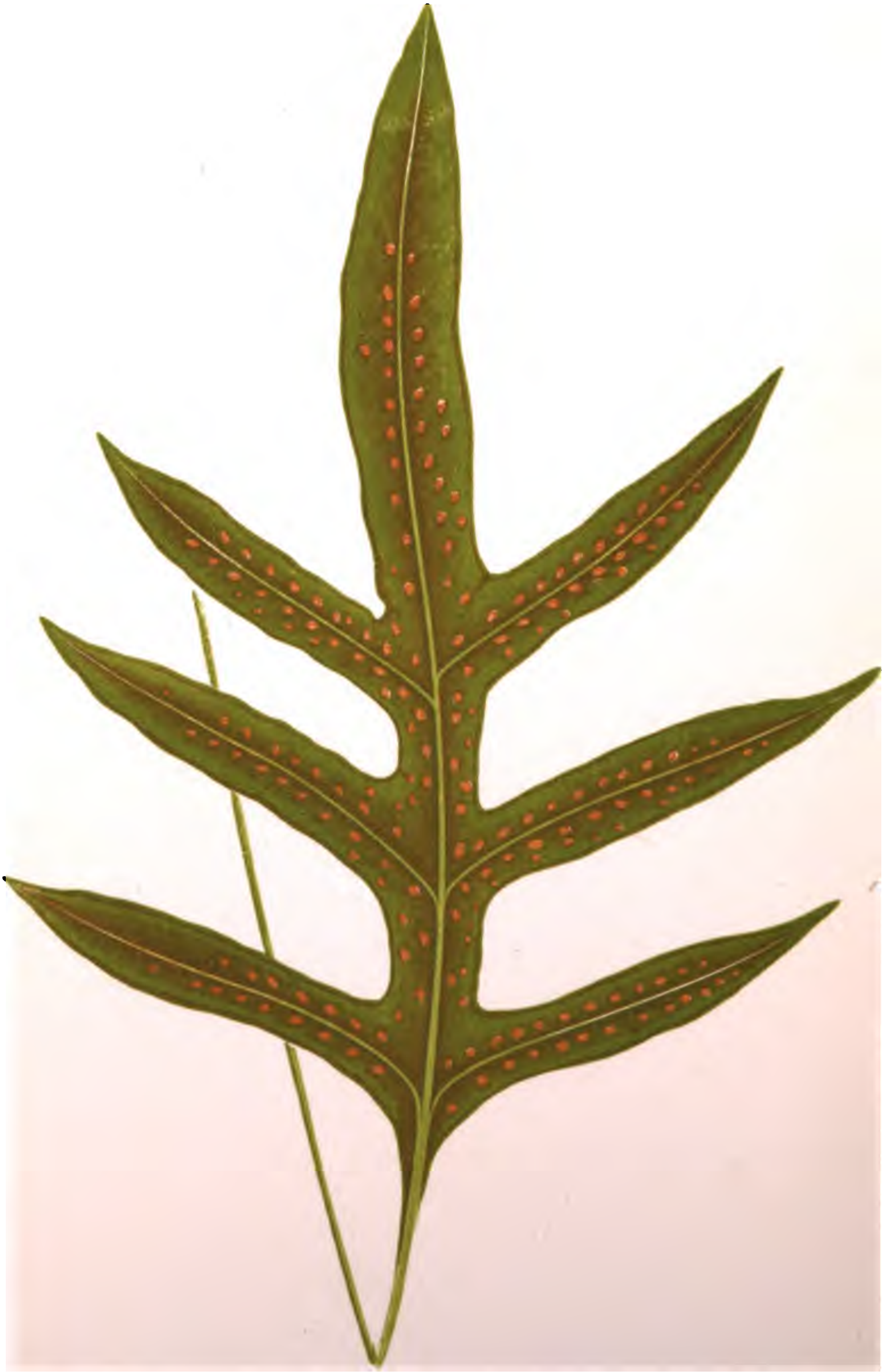
Stipes covered with scales, being densely covered near the rhizoma.

Length of frond from three to five feet.

My thanks are due to the Curator of the Cambridge Botanic Gardens, and to Messrs. Rollisson, of Tooting, for plants of *P. effusum*, and to Mr. J. Henderson, for fronds.

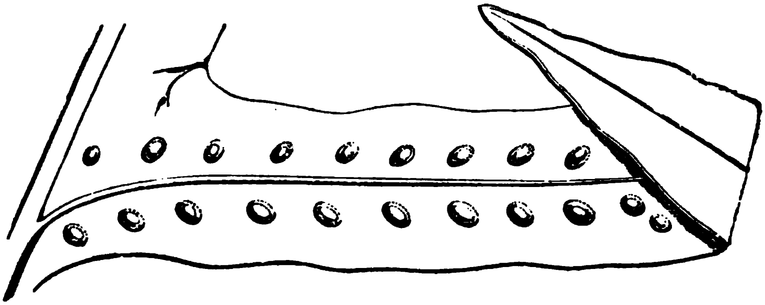
It is in the Catalogues of Messrs. Rollisson, of Tooting; Veitch, Jun., of Chelsea; Parker, of Holloway; Sim, of Foot's Cray; A. Henderson, of Pine-apple Place; Kennedy, of Covent Garden; Masters, of Canterbury; and Booth, of Hamburg.

The illustration is from a plant in my own collection.



POLYPODIUM LONGIPES.

XXIV



Portion of mature Frond, uppre side.

POLYPODIUM LONGIPES.

KUNZE.

PLATE XXIV.

Polypodium alternifolium,	LINK.
" *grossum,*	KUNZE, (*not* LANGSDORFF AND FISCHER.)
Chrysopteris longipes,	LINK.
Drynaria longipes,	J. SMITH.
" "	MOORE AND HOULSTON.

Polypodium—Polypody. *Longipes*—Long-stalked.

IN THE SECTION DRYNARIA OF AUTHORS.

THIS charming species deserves a place in every collection; the curious form, and smooth, shining, brilliant, intense green of the fronds, together with the diversity of appearance between those that are barren and those that are fertile, are in each case a recommendation so excellent, that it would be impossible to see it and not admire the *Polypodium longipes*. When well grown, the fronds, which all rise perpendicularly from the rhizoma, represent a dense miniature forest.

A native of the East Indies.

An evergreen species, requiring to be cultivated in a stove.

Fronds pinnatifid in form, decurrent at the base, coriaceous, having three or four broad, oblong, acuminate segments of from six to eight inches in length, and of a dark green colour.

The sori, which are oblong, are biserial, of large size, and immersed within the frond, raising protuberances on the superior surface.

The rachis and stipes pale green, the stipes being more than half the length of the frond; lateral, attached to a creeping rhizoma.

P. longipes has fronds from two fect to two feet and a half in length, which are glabrous.

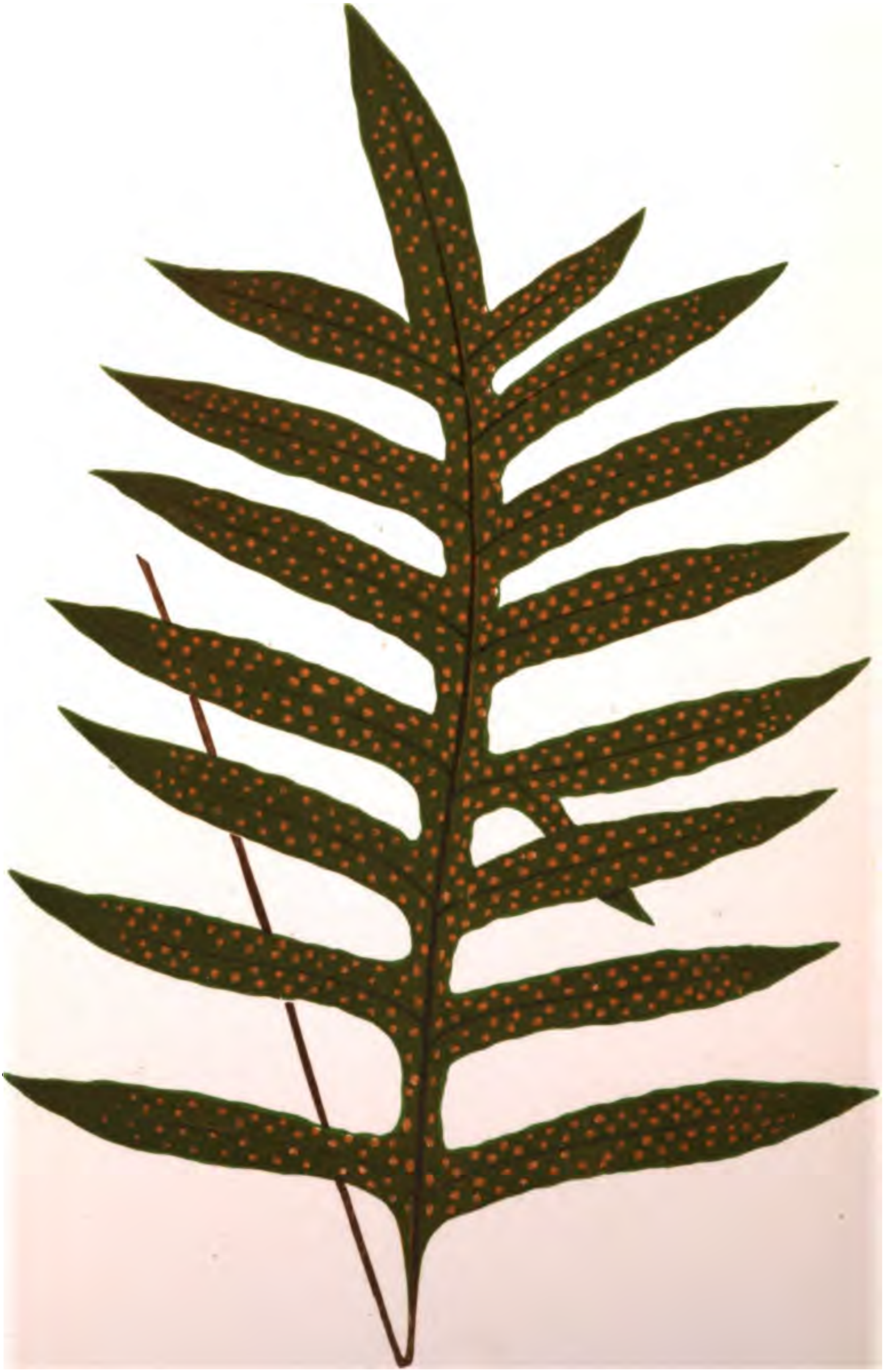
The present species, and most others having a creeping rhizoma, flourish best if elevated above the pot, as the rhizoma is apt to decay if allowed to become too wet.

P. longipes is perhaps best known as the *Drynaria longipes*.

A scarce Fern, which does not appear to be included in any of the Nurserymen's Catalogues, although introduced into England about the year 1823.

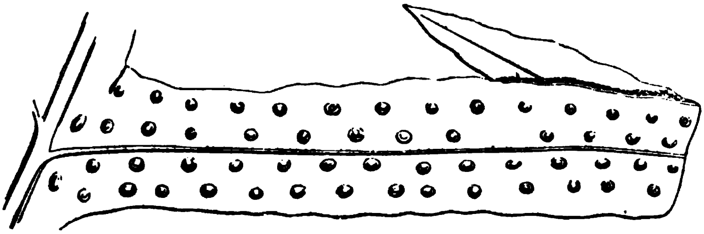
I am indebted to Mr. Henderson, of Wentworth, for a plant; and to the same gentleman and to Mr. Norman, of Hull, for excellent fronds.

The illustration is from a frond sent by Mr. Henderson, of Wentworth.



POLYPODIUM PHYMATODES.

XXV



Portion of mature Frond, upper side.

POLYPODIUM PHYMATODES.

LINNÆUS. SWARTZ. SCHKUHR. KAULFUSS. SPRENGEL.
JACQUIN. KUNZE. WILLDENOW.

PLATE XXV.

Polypodium grossum,	SPRENGEL. LANGSDORFF AND FISCHER.
" *scolopendria,*	BURMANN.
" *pleopeltifolium,*	OF GARDENS.
Chrysopteris phymatodes,	LINK.
Drynaria vulgaris,	J. SMITH. MOORE AND HOULSTON.
" *phymatodes,*	FEE.
Phymatodes vulgaris,	PRESL.

Polypodium—Polypody. *Phymatodes*—Warted.

IN THE SECTION DRYNARIA OF AUTHORS.

WHAT has been said in praise of the *Polypodium longipes* may be repeated with the *P. phymatodes,* which is a Fern in the same section, and equally deserving of commendation.

It seems desirable to remark that the Thrips, *(Thrips adonidum,)* soon produces fearful ravages with the smooth fronds of these Ferns if not destroyed; it will therefore be well to examine the under side of the fronds from time to time, in order that the pest may be speedily eradicated when it makes its appearance, before allowing it a sufficient length of time to do injury. Certain species seem more subject to this plague than others, and this also holds good with the *Aphidæ*. As an instance, the *Aphis* appears to shun the gold and silver-powdered Ferns of the genus *Gymnogramma*, yet not of the silver *Nothochlænas;* there must, therefore, be something in the farina of the former injurious to these insects. If a plant is not enjoying a proper climate or treatment, it seems to be more subject to be infected by insects; for instance, this will be found to be the case with the hardy *Scolopendriums* when grown in a greenhouse, the greenhouse species when cultivated in a stove, or the stove species when placed in a greenhouse; also a plant imperfectly drained. We may therefore often learn from the attacks of insects that our management in certain cases is not what it should be.

This Fern was introduced into England between 1816 and 1823, from the West Indies.

It has been found in both the East and West Indies, New Holland, Mauritius, Malay Islands, and East Indian Islands.

An evergreen stove species.

The form of the frond is triangularly ovate, pinnatifid, decurrent at the base, with oblong-pointed coriaceous segments, which are sometimes six inches in length, the lower one frequently lobed.

Sori nearly circular. Rhizoma creeping, black, and scaly.

Fronds somewhat erect, glabrous, pale green, and shining, and from twelve to eighteen inches in length.

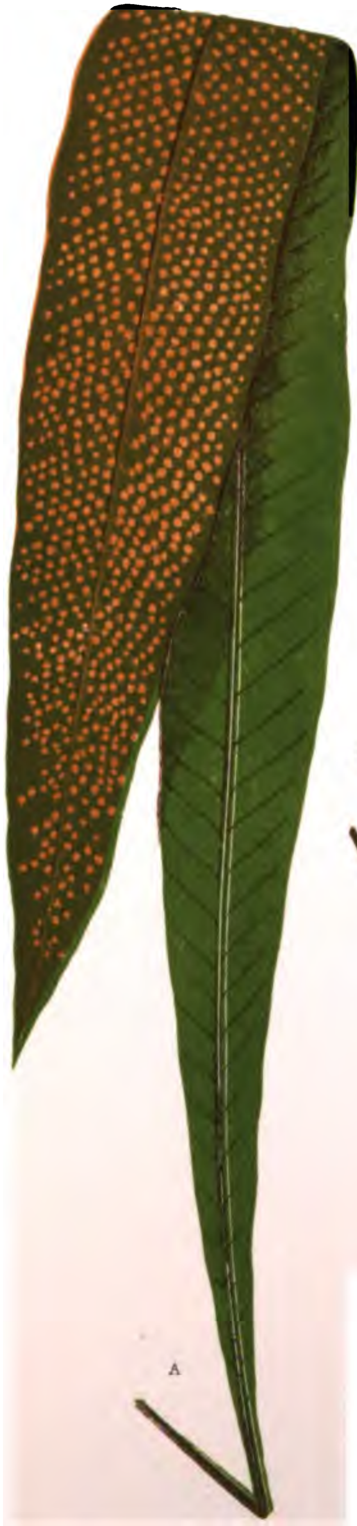
Mr. Moore remarks that there are two forms of this Fern in cultivation in England.

Best known as the *Drynaria vulgaris*.

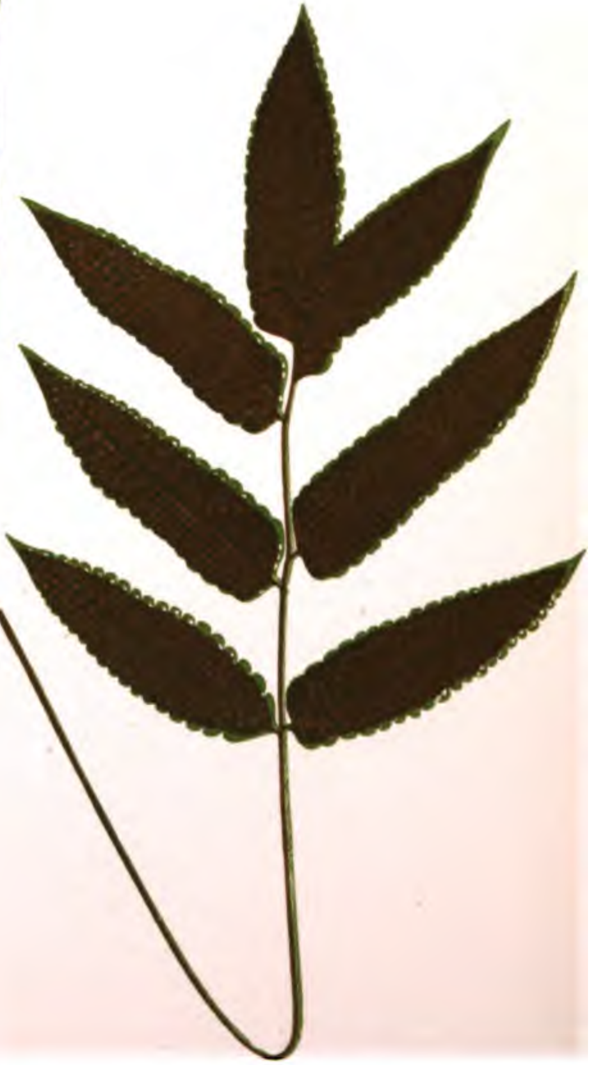
I am indebted to the Curator of the Cambridge Botanic Gardens; Messrs. Rollisson, of Tooting; and Messrs. Masters, of Canterbury, for plants; and to Mr. J. Henderson, of Wentworth; and Mr. Norman, of Hull, for fronds.

It is in the Catalogues of Sim, of Foot's Cray; Masters, of Canterbury; Rollisson, of Tooting; A. Henderson, of Pine-apple Place; Veitch, Jun., of Chelsea; Kennedy, of Covent Garden; and Booth, of Hamburg.

The illustration is from a frond forwarded by Mr. Henderson, of Wentworth.



A

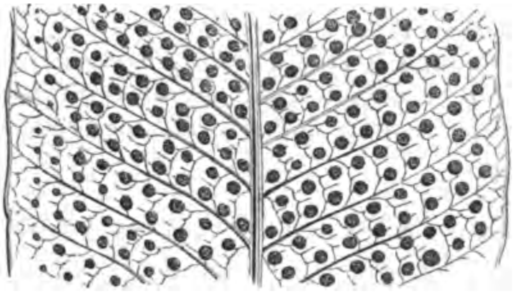


B

POLYPODIUM PHYLLITIDIS.

P. CRENATUM.

XXVI



Portion of mature Frond, under side.

POLYPODIUM PHYLLITIDIS.

LINNÆUS. KUNZE. *(Not of* SIEBER.)

PLATE XXVI.—A.

Cyrtophlebium phyllitidis,	J. SMITH. MOORE AND HOULSTON.
Campyloneurum phillytidis,	LINK.
" *phyllitidis,*	PRESL.
Campyloneuron phillitidis,	FEE. PLUMIER. PETIVER.

Polypodium—Polypody. *Phyllitidis*—Hart's-Tongue.

IN THE SECTION CYRTOPHLEBIUM OF AUTHORS.

To those who do not understand the botanical distinctions between one genus and another, the *Polypodium phyllitidis* may very naturally be called the Hart's-Tongue Fern of the Tropics, as in the form of the frond it has some slight resemblance to our *Scolopendrium vulgare.*

An interesting and desirable species, yet one seldom to be met with except in our larger collections.

A West Indian Fern.

The *P. phyllitidis* is an evergreen stove species.

The frond is simple, glabrous, somewhat undulated and narrow, lanceolate-acuminate in form, being decurrent at the base; coriaceous.

Sori medial.

The length of the frond varies from two feet to two feet and a half. The colour pale green.

A rigid Fern, differing in habit from the *Scolopendrium vulgare*, to which it has been likened, by being erect.

The fronds rise out of a scaly short creeping rhizoma.

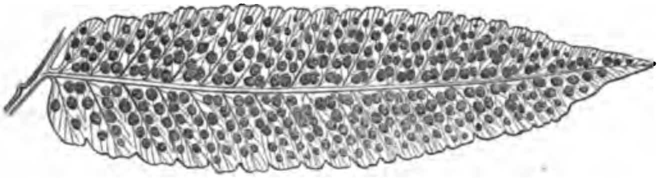
Introduced into England in 1793.

My thanks are due to Mr. Henderson, of Wentworth, for a plant of this species; and to the same gentleman; to Mr. Norman, of Hull; and to Messrs. Booth, of Hamburg, for fronds.

P. phyllitidis may be procured from Messrs. Veitch, of Chelsea; Sim, of Foot's Cray; A. Henderson, of Pine-apple Place; Kennedy, of Covent Garden; and Booth and Son, of Hamburg.

This species is best known in England as the *Cyrtophlebium phyllitidis*.

The illustration is from a frond sent by Mr. Norman, of Hull.



Portion of mature Frond, under side.

POLYPODIUM CRENATUM.

Kunze. Swartz. Willdenow. Kaulfuss.

PLATE XXVI.—B.

Polypodium megalodus,	Sieber.
Goniopteris crenata,	Presl. Link. Swartz. Plumier.
" "	J. Smith. Moore and Houlston.
" "	Fee. Hooker and Bauer.
Lastrea poitoei,	Bory.

Polypodium—Polypody. *Crenatum*—Scalloped.

In the Section Goniopteris of Authors.

The fascination attending the cultivation of Ferns is so great, and increases so rapidly, as more species are added to a collection, that it requires no words from me to urge those who have commenced, to prosecute their cultivation. To the plant grower who has not yet begun this class of Botany, it need only be remarked that no species of plants improves the appearance of a conservatory, stove, or of an orchid house, more than Ferns; the great diversity of form and colour of the fronds materially heightens the effect produced by our most gorgeous exotics.

Well has it been said that Ferns are always in flower—winter and summer are alike to the tropical species; new fronds are constantly appearing, others approaching maturity and exhibiting their curious and interesting fructification, so that a continual series of interesting objects are ever before the eye.

The *Polypodium crenatum* is a beautiful Fern which was raised at Kew in the year 1835.

A native of the West Indies, St. Domingo, Martinico, and St. Crucis.

An evergreen stove species.

The fronds are pinnate, the pinnæ pubescent, entire, oblong ovate-acuminate, membranous and crenate on the edge. Very short petioles.

Sori medial, and very conspicuous.

Rachis and stipes green.

Fronds lateral, adherent to a short creeping rhizoma.

Length of frond from eighteen inches to two feet; colour pale green.

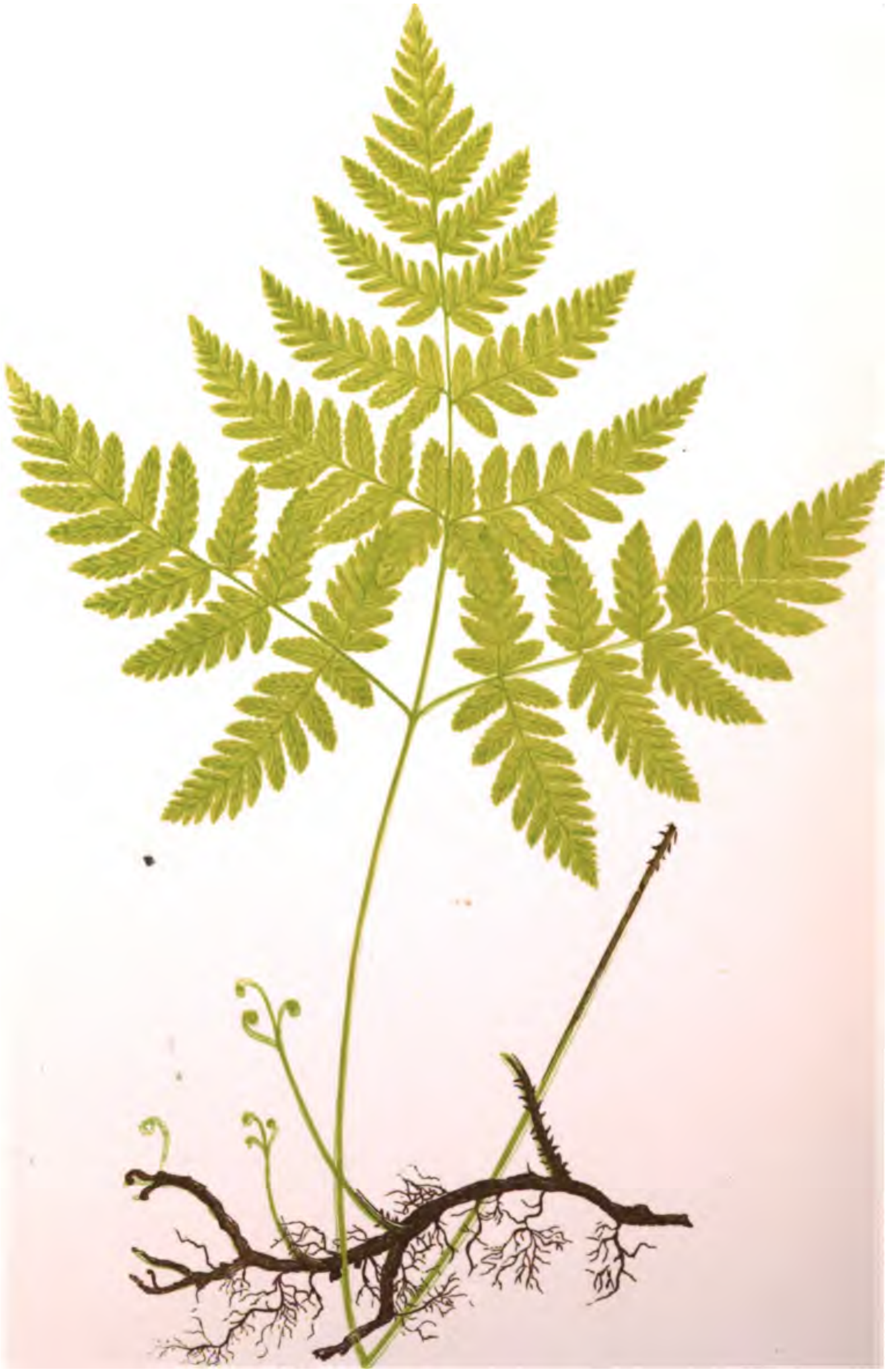
More generally known as the *Goniopteris crenata.*

A rare Fern in cultivation in England.

It does not appear to be in any of the English Nurserymen's Catalogues; it is, however, in that of Messrs. Booth, of Hamburg.

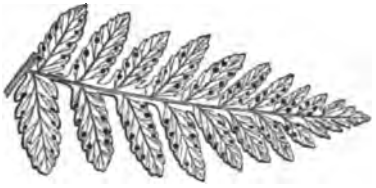
I have not been able to procure this species; my thanks are, however, due to Mr. Henderson, of Wentworth, for a beautiful fertile frond.

The illustration is from Mr. Henderson's frond.



POLYPODIUM DRYOPTERIS

XXVII



Portion of mature Frond, under side.

POLYPODIUM DRYOPTERIS.

LINNÆUS. KUNZE. LINK. PRESL. WILLDENOW.
SCHKUHR. SPRENGEL. MOORE. BABINGTON.
SOWERBY. NEWMAN. HOOKER AND ARNOTT. FRANCIS.
MACKAY. J. E. SMITH. J. SMITH. HUDSON.
PRATT. WITHERING. LIGHTFOOT. BOLTON. ROEM. DEAKIN.

PLATE XXVII.

Polypodium pulchellum,	SALISBURY.
Polipodium dryopteris,	BOLTON.
Lastrea dryopteris,	BORY. NEWMAN.
Polystichum dryopteris,	ROTH.
Phegopteris dryopteris,	FEE.
Gymnocarpium dryopteris,	NEWMAN.

Polypodium—Polypody. *Dryopteris*—............?

PERHAPS no British Fern is so universally admired as the 'Oak Fern.' Its rapid and elegant growth, and the vivid green of its fronds render it a charming addition to our hardy Fernery.

It is a native of England, Scotland, Wales, Ireland, Lapland, Sweden, Russia, North Cape, Germany, Hungary, Croatia, France, Switzerland, Italy, Spain, Siberia, Gibraltar, Kamtschatka, Asia, Africa, Labrador, Greenland, Newfoundland, United States of North America, the Rocky Mountains, Columbia River, etc. It has thus a very extensive geographical range. Singular enough it has not been found in Greece or Turkey.

The *Polypodium dryopteris* is found most plentifully in wild mountainous districts and damp woods. In Scotland and Wales it is exceedingly abundant, as it is also in Northumberland, Durham, Westmorland, Cumberland, Yorkshire, and Lancashire. Other counties are Derbyshire, Staffordshire, Shropshire, Cheshire, (rare,) Herefordshire, Worcestershire, Gloucestershire, and Somersetshire. In Ireland it does not appear to be found except in the county of Antrim, being the rarest of the Irish Ferns.

The researches of Johnston, Wilson, Pinder, Westcott, Newman, Lees, Bennett, Purchas, Westcombe, Withering, Moore, etc., have given to the world a list of British habitats too numerous to mention.

Common as this species is, it appears to be less subject to change its form than most other species. Formerly the *P. Robertianum* of Kunze, (the *P. calcareum* of J. Smith,) was looked upon as a variety of the present species, and indeed in the form of the frond it does very closely resemble it, yet there are certain characters which will be hereafter enumerated, so widely different that the two plants must be considered distinct.

Mr. Moore, in the "Nature-printed Ferns," and Mr. Newman, in his "History of British Ferns," have given such full and valuable information of the British *Polypodiums*, that the subject may almost be said to be exhausted.

The Oak Fern is very readily cultivated in the hardy Fernery, either flourishing amongst rocks, or planted in light damp soil; it is very rapid in its growth, and therefore requires a light soil to enable the rhizoma to creep along in all directions. Care should be taken that it be planted in a shady part of the Fernery, as sunshine upon the fronds robs them of that vivid green which is so marked a feature in this Fern. In an early season the fronds appear in March, but more commonly it is April before they expand; they soon become fertile, and on the first return of cold weather in autumn disappear once more, the *P. dryopteris* being a deciduous species. Mr. Newman, in his "History of British Ferns," has well described the appearance of the young fronds as three little balls placed on wires.

The Oak Fern is very constant to the typical form, being less liable to vary from seedling plants than most species.

Fronds ternate, pentangular-deltoid, perfectly smooth, membranaceous, brilliant green in colour, the branches pinnate or sub-bipinnate, pinnæ deeply pinnatifid, opposite. Frond three-branched. Pinnules oblong-obtuse, crenate, less divided and smaller as they approach the apex. Veins simple or forked.

Sori small, circular, scattered over the whole of the under side of the frond; numerous.

The fronds are from four to fourteen inches in length. The stipes occupying two thirds of this length. They grow upright, slender, are tinged with purple, very brittle, smooth, and with few scales.

Rachis smooth.

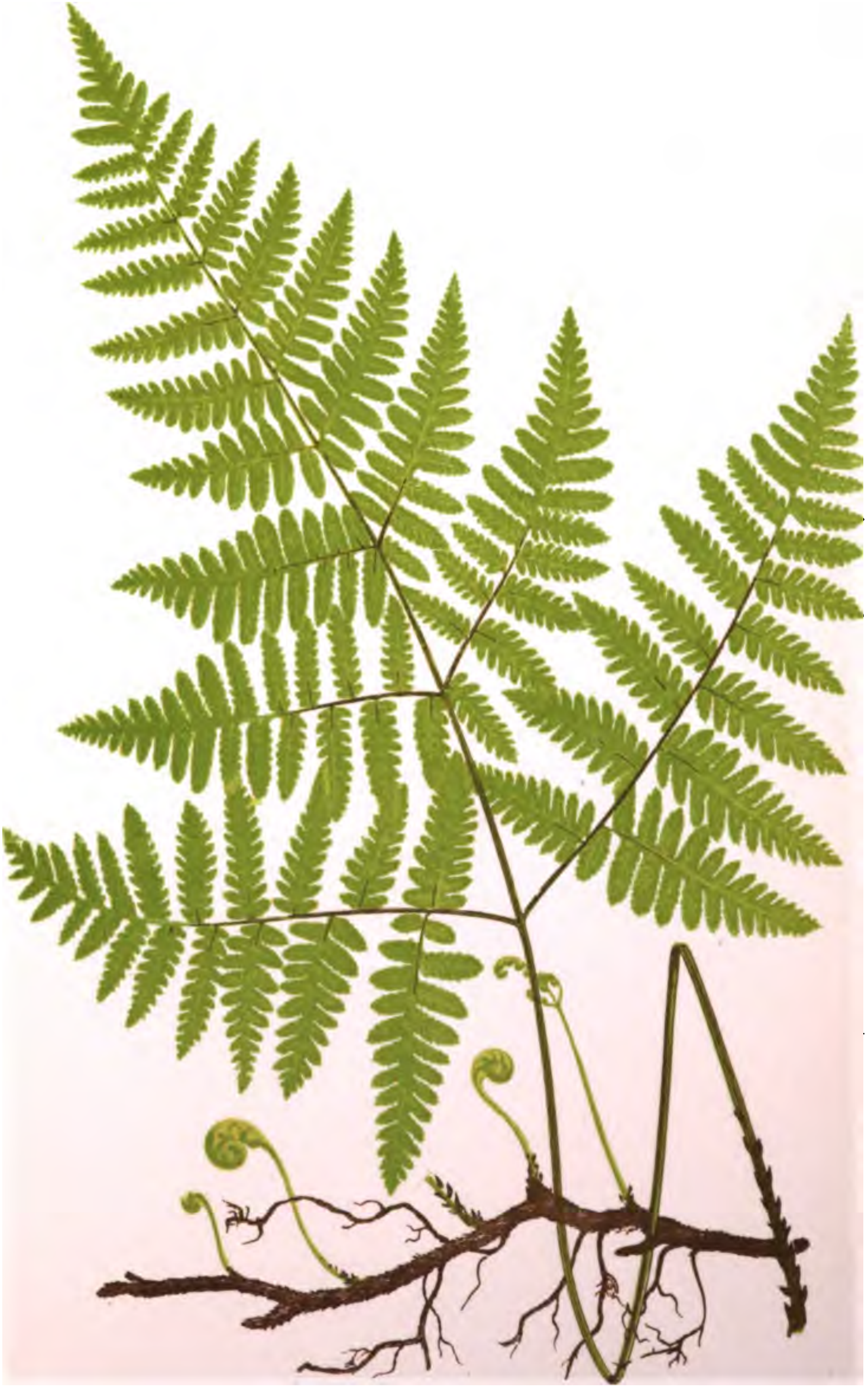
Rhizoma creeping, much branched.

Both this species and the next are easily propagated by divisions of the rhizoma.

I have collected this Fern near Matlock, and in great profusion on Longridge Fell, Lancashire.

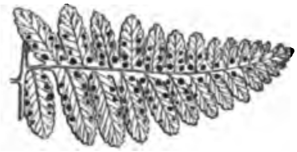
It is in the Fern Catalogues of Sim, of Foot's Cray; Osborn and Sons, of Fulham; Kennedy, of Covent Garden; A. Henderson, of Pine-apple Place; E. G. Henderson, of St. John's Wood; Parker, of Holloway; Rollisson, of Tooting; J. Veitch, Jun., of Chelsea; Bass and Brown, of Sudbury, Suffolk; E. Cooling, Derby; and Pearson, of Chilwell, near Nottingham.

The illustration is from a plant in my own collection, procured several years ago from W. Winstanley, Esq., at Chaigeley Manor, Lancashire.



POLYPODIUM ROBERTIANUM.

XXVIII



Portion of mature Frond, under side.

POLYPODIUM ROBERTIANUM.

KUNZE. HOFFMANN. KOCH. FRIES. MOORE.

PLATE XXVIII.

Polypodium calcareum,	J. SMITH. LINK. WILLDENOW.
" "	PRESL. NEWMAN. SPRENGEL.
" "	SOWERBY. FRANCIS. DEAKIN. PRATT.
" "	HOOKER AND ARNOTT. BABINGTON.
Polypodium dryopteris,	BOLTON. NEWMAN. LEDEBOUR. A. GRAY.
Nephrodium dryopteris,	MICHAUX.
Lastrea calcarea,	BORY. NEWMAN.
Phegopteris calcarea,	FEE.
Lastrea Robertiana,	NEWMAN.
Gymnocarpium Robertianum,	NEWMAN.

Polypodium—Polypody. *Robertianum*—Named after a Botanist.

THE *Polypodium Robertianum* is a very similar-looking species to the *P. dryopteris,* and was for some years merely looked upon as a variety of the same Fern. This is a larger and more robust Fern, and the frond is covered with a pubescence, that gives it the appearance of being dusted over with lime. Bolton was the first to point out the difference between *P. Robertianum* and *P. dryopteris,* and Hoffmann to pronounce it a distinct species. Mr. Wilson and Mrs. Riley have both paid particular attention to these Ferns, indeed the evidence of various botanists has shewn conclusively that the two species are quite distinct.

It is a native of England, Wales, Hungary, France, Germany, Switzerland, and the United States, Canada, Norway, and Asia.

Although strictly speaking it is a North of England Fern, yet it is somewhat strange that it has not been discovered in Scotland, nor indeed in Ireland.

Found in the counties of Durham, Cumberland, Westmorland, Yorkshire, Lancashire, Derbyshire, Gloucestershire, Somersetshire, and less sparingly in Oxfordshire and Wiltshire. In Wales it is found in Denbighshire.

One especial distinction Mr. Newman points out—the three portions of the young frond never assume the appearance of three little balls; also, unlike *P. dryopteris*, it seems to delight in sunshine: all the plants which I have seen growing at Matlock were on sunny rocks.

The same light soil is requisite for this species as for *P. dryopteris*, with the addition of abundance of limestones.

Hoffmann's name of *P. Robertianum* has a prior claim to that of *P. calcareum* of Smith; this is to be regretted, as the latter is very appropriate.

The present species is known as the "Limestone Polypody," "Smith's Polypody," and the "Rigid Three-branched Polypody."

This Fern is not subject to variety from seed.

Mr. Moore, in the "Ferns of Great Britain and Ireland," remarks that in the West of England it only descends to two hundred and fifty feet above the sea, and in the north ascends to nine hundred feet. Dr. Hooker found it on the Himalaya Mountains at an elevation of from five thousand to eight thousand feet.

In a wild state it seems to occur only in the limestone districts.

A British Fern.

The fronds are bipinnate, with the lowest pair of pinnæ occasionally sub-bipinnate on the posterior side. Pinnæ variable, the lowest pair largest, triangular in form, stalked, and frequently bipinnate; the pinnæ nearer the apex of the frond sessile, pinnate, or pinnatifid. Pinnules, the lowest larger on the posterior side, each succeeding pinnules like the smaller ones of the pair immediately below them. The whole frond triangular in form, and three-branched. Veins simple, or forked.

Sori round, small, and scattered over the whole under surface of the frond, becoming partially confluent.

Fronds from six to eighteen inches in length, somewhat rigid, upright, lateral, adherent to a scaly creeping rhizoma; colour of fronds a dull greyish green.

Stipes often occupying two thirds of the length of the frond; rachis glandulose; rhizoma much branched. Both the stipes and fronds covered with small glands, which give the plant a dusty appearance.

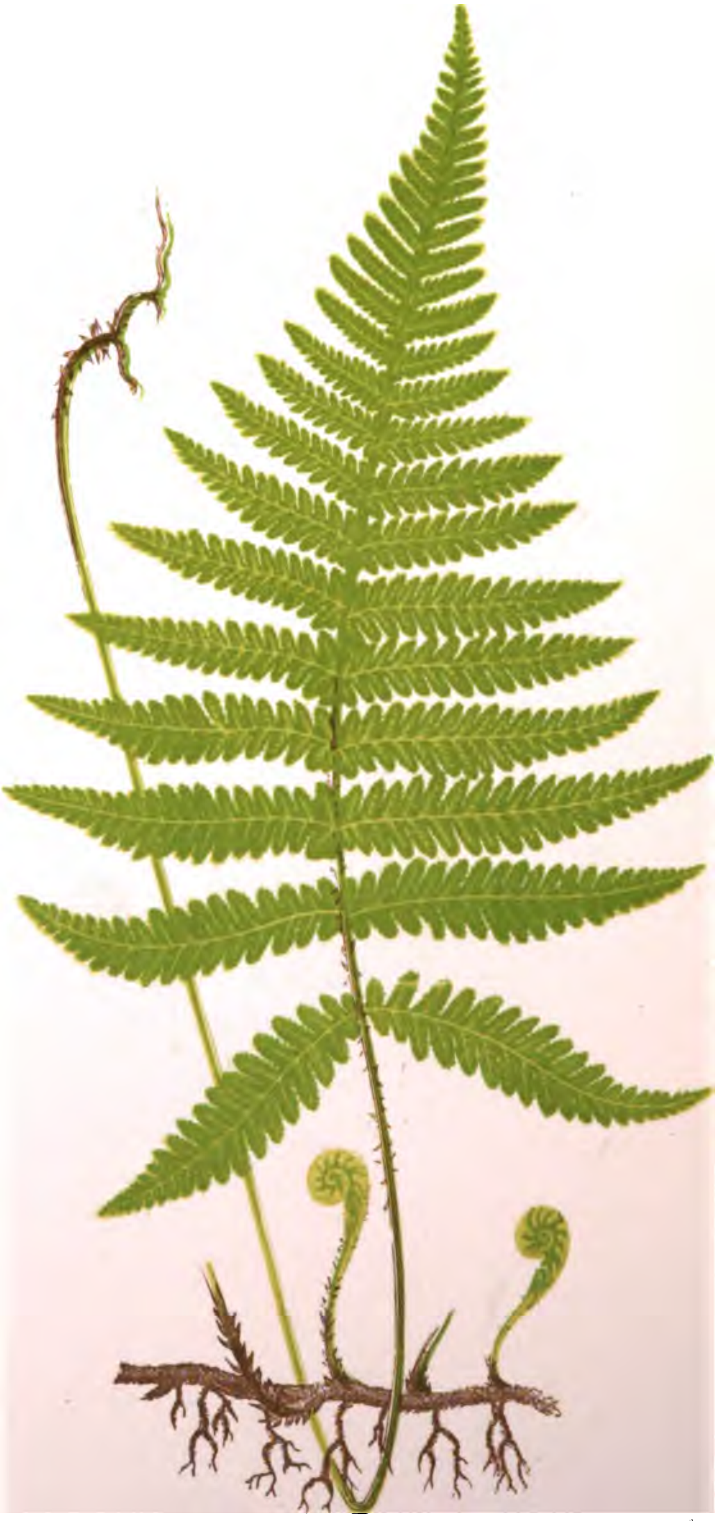
This Fern differs from *P. dryopteris* in having the divisions of the frond pinnate instead of ternate.

Not subject to variety from spores.

I am indebted to Mr. Joseph Sidebotham, of Manchester, and the Rev. W. Miller, late Curate of Wirksworth, for plants of this species.

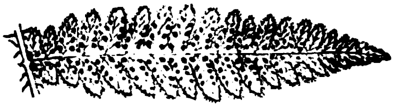
It is in the Catalogues of Sim, of Foot's Cray; Osborn and Sons, of Fulham; Kennedy, of Covent Garden; A. Henderson, of Pine-apple Place; E. G. Henderson, of St. John's Wood; Parker, of Holloway; Rollisson, of Tooting; J. Veitch, Jun., of Chelsea; Bass and Brown, of Sudbury, Suffolk; and Pearson, of Chilwell, near Nottingham.

The illustration is from a plant in my own collection, and formerly gathered wild at Matlock.



POLYPODIUM PHEGOPTERIS.

XXIX



Portion of mature Frond, under side.

POLYPODIUM PHEGOPTERIS.

LINNÆUS. LIGHTFOOT. HUDSON. WITHERING. SMITH.
MACKAY. FRANCIS. NEWMAN. PRATT.
HOOKER AND ARNOTT. MOORE AND HOULSTON. KUNZE.
LINK. PRESL. SCHKUHR. BABINGTON. BOLTON.
SOWERBY. WILLDENOW.

PLATE XXIX.

Polypodium latebrosum,	SALISBURY.
" *phegopteris,*	BOLTON.
Phegopteris polypodioides,	FEE.
Polystichum phegopteris,	ROTH.
Lastrea phegopteris,	BORY. NEWMAN.
Gymnocarpium phegopteris,	NEWMAN.
Aspidium thelypteris,	E. SMITH.
Polypodium connectile,	MICHAUX.

Polypodium—Polypody. *Phegopteris*—The Beech Fern.

THE Beech Fern of some, and the Sun Fern of others, is a well-marked British species, and easily recognised by the lowest pair of pinnæ being separated from the remainder—hanging downwards at about an angle of forty-five degrees, whilst the remainder are inclined upwards.

Its usual habitation is a damp wood, or in the neighbourhood of a waterfall.

A native of France, Germany, Switzerland, Italy, the Altai Mountains, Lake Baikal, Kamtschatka, Unalaska, Algeria, Lapland, United States, England, Scotland, the Islands of Shetland and Orkney, the Hebrides, Spain, Wales, Ireland, and the Isle of Man.

In England, it is found in Northumberland, Cumberland, Durham, Westmoreland, Yorkshire, Lancashire, Cheshire, Derbyshire, Staffordshire, Shropshire, Herefordshire, Gloucestershire, Devonshire, Cornwall, Sussex; very common in Wales and Scotland, and rare in Ireland.

A hardy, indigenous, and deciduous Fern.

The frond is bipinnatifid, the lowest pinnæ deflexed and standing forward; segments entire, and of a linear-lanceolate form, the lower ones adnate-decurrent.

Rhizoma rather scaly.

The frond lateral, and adherent to the rhizoma.

Sori intramarginal, and somewhat oblong in form.

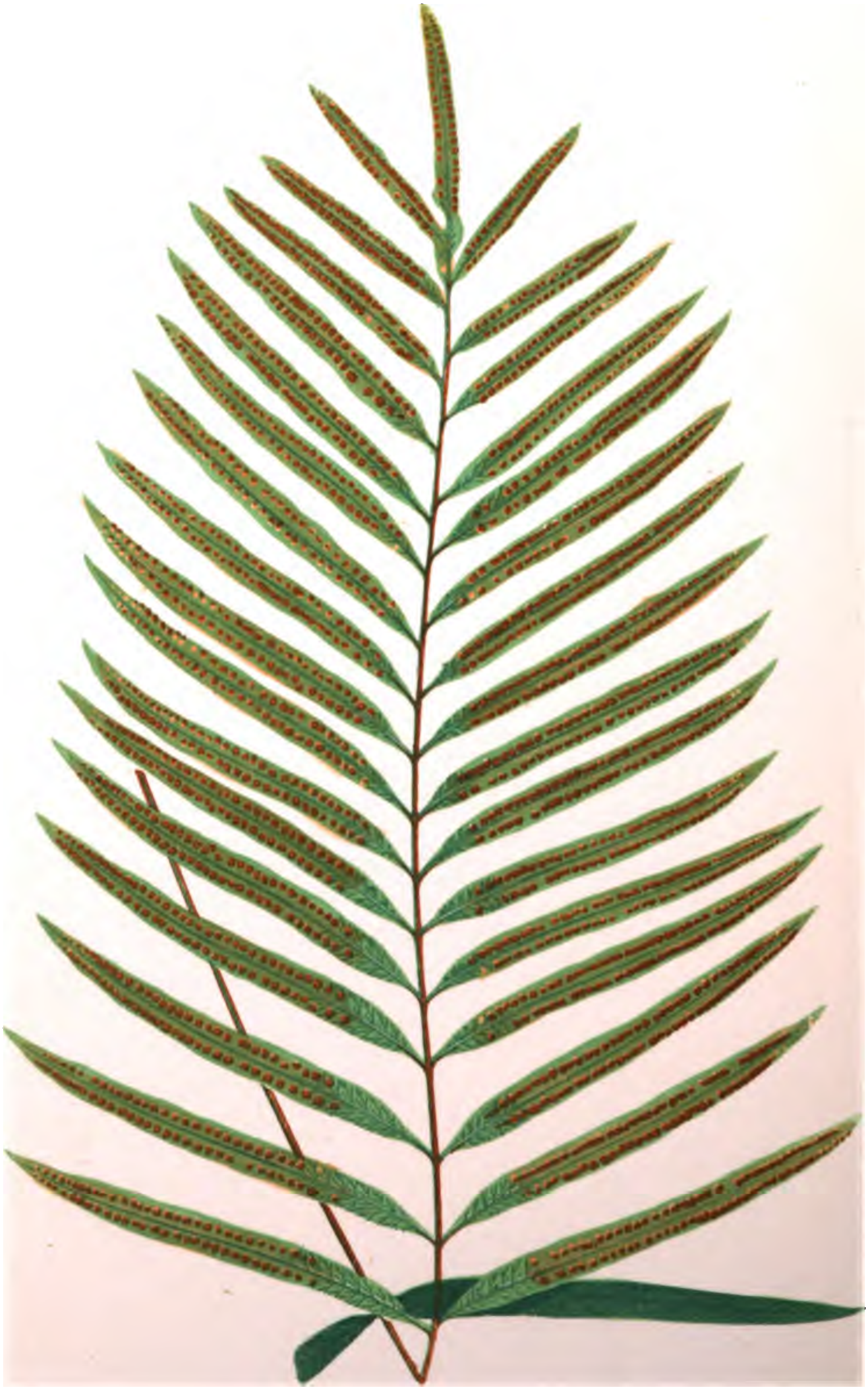
Length of frond from six to twelve inches.

My thanks are due to Mr. Joseph Sidebotham, of Manchester, for plants of this species, and to Mr. Norman, of Hull, for fronds.

It may be procured from the following Nurserymen:—Messrs. A. Henderson, of Pine-apple Place; R. Kennedy, of Covent Garden; J. Veitch, Jun., of Chelsea; W. Rollisson, of Tooting; J. Booth and Son, of Hamburg; Bass and Brown, of Sudbury, Suffolk; R. Parker, of Holloway; J. Pearson, of Chilwell, near Nottingham; E. G. Henderson, of St. John's Wood; Osborn and Sons, of Fulham; and R. Sim, of Foot's Cray, Kent.

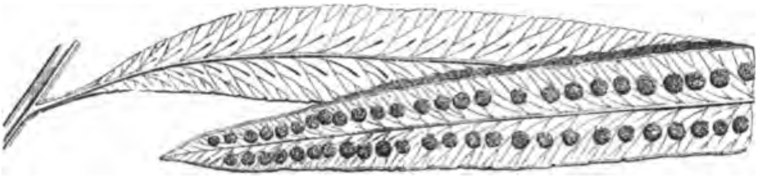
A species which does remarkably well in a Fernery, if planted in a rich light soil, amongst pieces of rock.

The illustration is from a plant in my own collection, which I found several years ago on Longridge Fell, about half way between Preston and Clitheroe, where this species is abundant.



POLYPODIUM HENCHMANII.

XXX



Portion of mature Frond.

POLYPODIUM HENCHMANII.

J. SMITH. MOORE AND HOULSTON.

PLATE XXX.

Polypodium—Polypody. *Henchmanii*—Named after a Botanist.

Polypodium henchmanii is a noble and graceful Fern, with a pendulous habit and bluish green fronds. It is a species which should be universally grown in all good collections; unfortunately it is a species almost unprocurable, as it does not seem to have got into any of the Nurserymen's Catalogues up to the present time. It appears to have been first introduced into England, un-named, about the year 1848, yet from what source I am unable to say. There is, I believe, a fine plant of the *P. henchmanii* in the Royal Gardens, Kew, and another in the Wentworth collection. In general appearance it approaches near to the *P. diversifolium* of some authors, known more generally as the *Drynaria diversifolia.*

An evergreen stove Fern.

A native of Mexico.

The fronds are glabrous, pinnate, the form of the pinnæ being linear-lanceolate, very long and narrow, decurrent at the base.

The pinnæ, which are of a dark bluish green colour, are very smooth, having a polished appearance.

The footstalk of the frond is articulated on a creeping rhizoma. The rhizoma is covered with scales.

Length of frond two feet.

The sori, which are large and conspicuous, are uniserial, and of a brilliant brown colour.

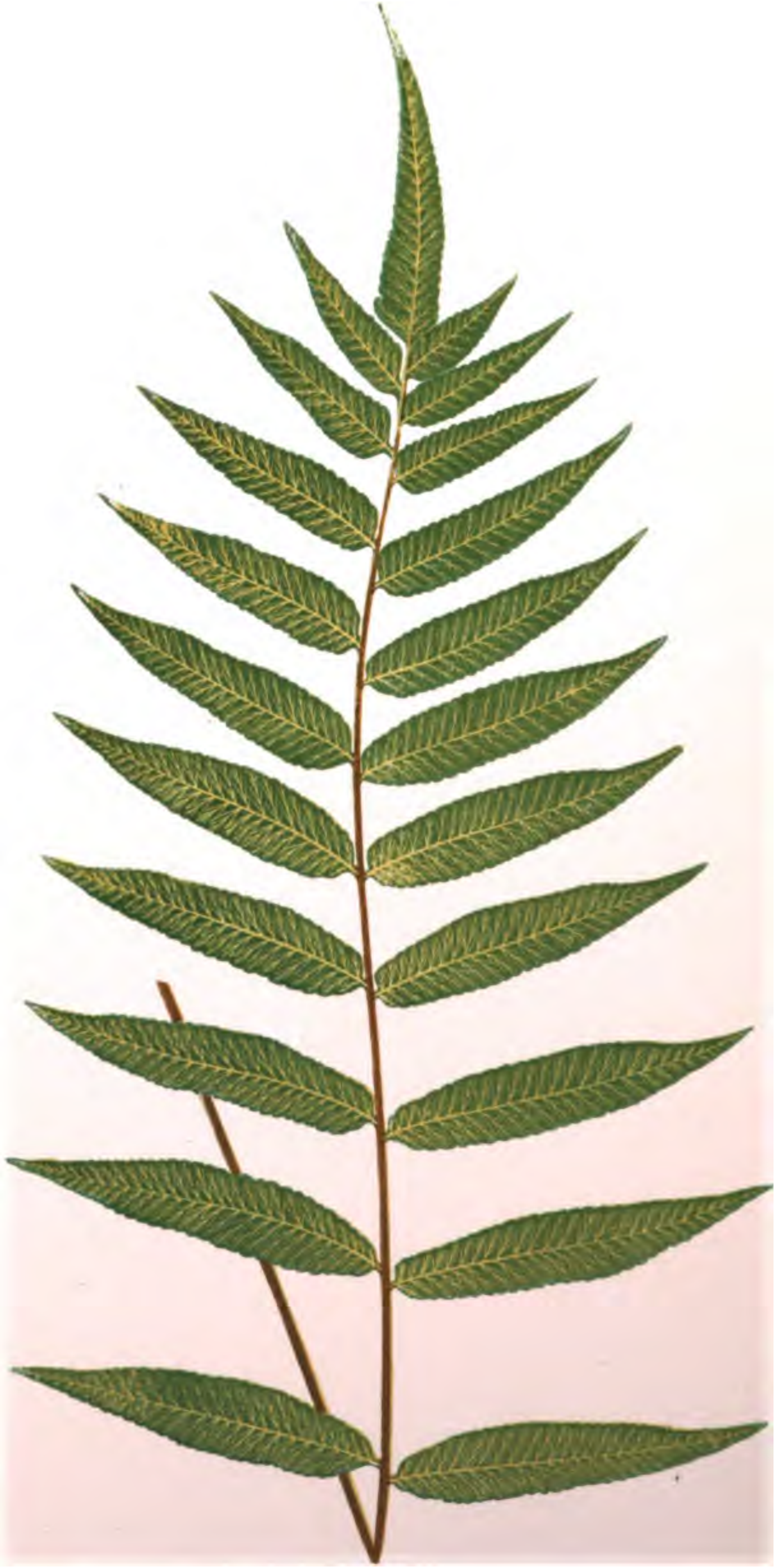
I have been unable to procure a plant of *P. henchmanii.*

Mr. J. Henderson, of Wentworth, has kindly supplied me with good fronds.

It is said to be a species easy of cultivation.

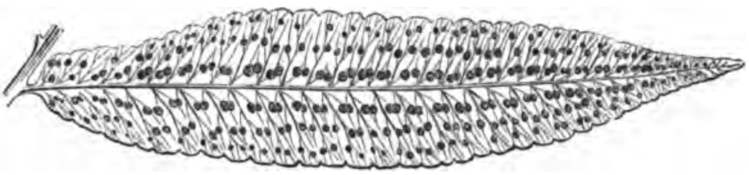
Does not occur in any of the Nurserymens' Catalogues.

The illustration is from one of Mr. Henderson's fronds.



POLYPODIUM FRAXINIFOLIUM.

XXXI



Portion of mature Frond, under side.

POLYPODIUM FRAXINIFOLIUM.

Jacquin. Kunze. Swartz. Willdenow. (*Not of* Presl.)

PLATE XXXI.

Polypodium distans,	Raddi.
" *freyreisii,*	Sprengel.
" *proliferum,*	Link. Kaulfuss.
" *viviparum,*	Raddi.
" *polystichum,*	Link.
Goniopteris fraxinifolia,	Link. Presl. J. Smith.
" "	Fee. Moore and Houlston.

Polypodium—Polypody. *Fraxinifolium*—Ash-leaved.

In the Section Goniopteris of Authors.

Seldom is this pretty and distinct Polypody to be seen in the Fern collections, if we exclude the largest growers, and those persons whose especial interest and study are the Filices. Its ash-leaf appearance has gained for it the appropriate name of *Polypodium fraxinifolium,* a name which is now generally adopted, although it can boast of half-a-dozen others. As I have been unable to procure a plant of this species, I cannot speak as to the cultivation of it from experience; yet I am told that it is by no means difficult to manage under ordinary Fern treatment.

It is found under the American meridian, at Brazil, and on St. Catharine's Island, where it was noticed by Chamisso.

P. fraxinifolium was introduced into the Royal Gardens, Kew, in the year 1841, having been sent there by Mr. D. Cameron.

An evergreen stove species.

The fronds, which are pinnate, have entire pinnæ, which are lanceolate-acuminate, and are smooth and shining, being truncate at the base. Terminal, being adherent to an erect fasciculate rhizoma.

Sori medial, eventually becoming confluent, so situated as to come together more or less in pairs; colour dark brown, veins branched.

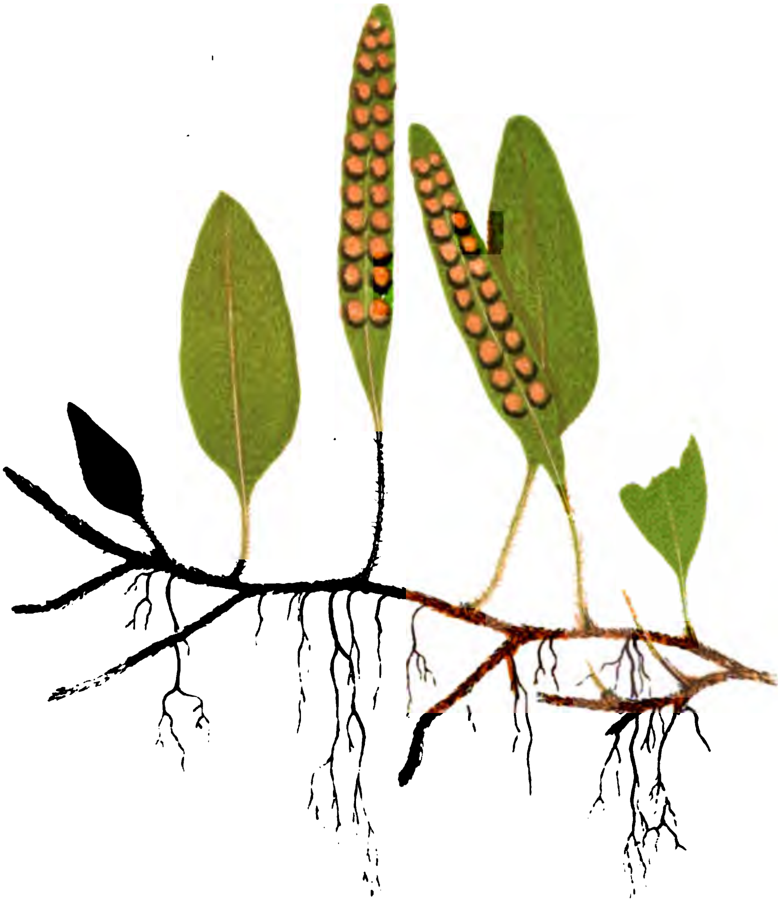
The length of the frond is two feet, and the colour deep green.

Best known as the *Goniopteris fraxinifolia.*

Mr. J. Henderson, of Wentworth, has been good enough to forward me fronds of this species.

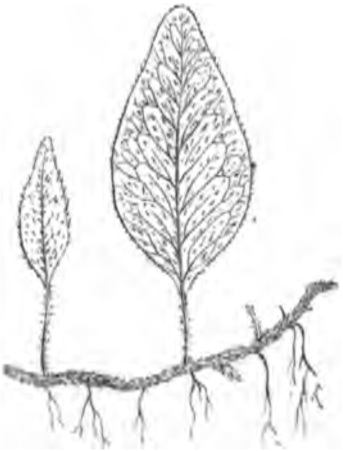
It may be procured of Mr. Kennedy, of Covent Garden; Messrs. Rollisson, of Tooting; and A. Henderson, of Pine-apple Place.

The illustration is from a frond gathered off Mr. Henderson's plant.



POLYPODIUM PILOSELLOIDES.

XXXII



Portion of rhizoma and barren Fronds.

POLYPODIUM PILOSELLOIDES.

LINNÆUS. KUNZE. PLUM.? PETIVER.?

PLATE XXXII.

Polypodium vaccinifolium,	Raddi, (*not of* Langsdorff and Fischer, Kaulfuss, Sprengel, *or* Willdenow.)
" *cajanense,*	Desvaux.
" *ciliatum,*	Willdenow. Kaulfuss.
" *tectum,*	Kaulfuss.
Craspedaria piloselloides,	Fee.
Marginaria piloselloides,	Presl.
Craspedaria ciliatum,	Link. Sprengel.
Goniophlebium piloselloides,	J. Smith. Hooker and Bauer.
" "	Swartz. Moore and Houlston.

Polypodium—Polypody. *Piloselloides*—Mouse-ear like.

IN THE SECTION GONIOPHLEBIUM OF AUTHORS.

THIS *Niphobolus*-looking plant is amongst the more diminutive of our Exotic Ferns, and is an interesting little species when well grown, and diversified with both barren and fertile fronds.

A native of the West Indies, Cayenne, Brazil, and Madagascar.

It was introduced into the Royal Gardens, Kew, in the year 1793.

An evergreen stove species.

Like the *Niphobolus* tribe, the fertile and sterile fronds differ from each other both in size and form. The fertile fronds are linear-oblong, being decurrent at the base; they are simple, hairy, and vary from two to three inches in their length. The sterile fronds are also simple, hairy, somewhat ovate in form, decurrent at the base, and vary from one to two inches in length.

Colour of the fronds pale green, articulated upon a thin wiry-looking creeping rhizoma.

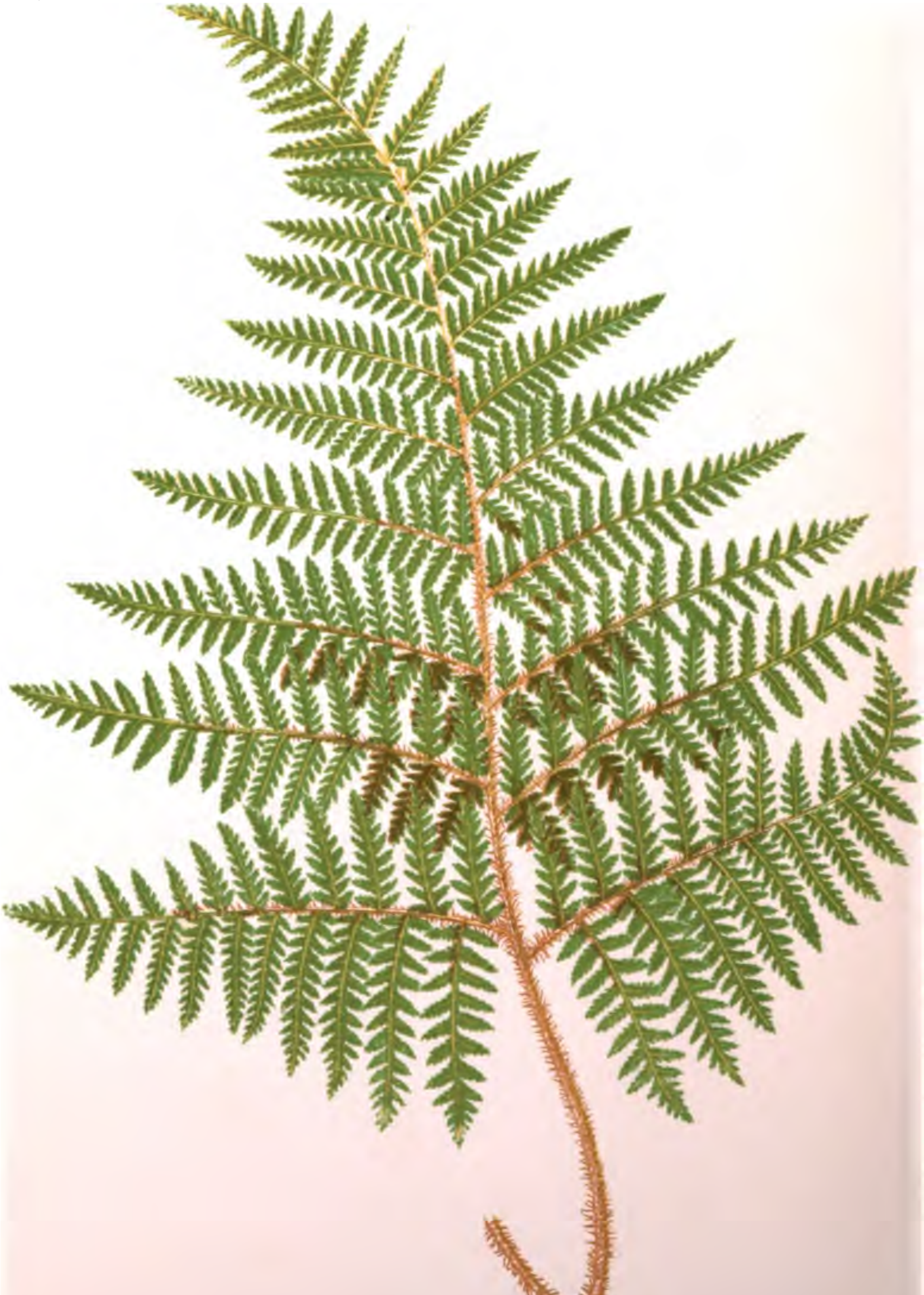
Sori uniserial, being placed in a tuft of narrow scales.

Polypodium piloselloides is easily cultivated. Best known as *Goniophlebium piloselloides* amongst Fern growers.

My thanks are due to Mr. Henderson, of Wentworth; and to Mr. Lamb, gardener to Francis Wright, Esq., of Osmaston Manor, near Ashbourne, for plants of this species; and to the former gentleman, and to Mr. Sim, of the Foot's Cray Nursery, Kent, for abundance of fronds.

It is in the Catalogues of Messrs. Veitch, Jun., of Exeter; Sim, of Foot's Cray; Masters, of Canterbury; Booth and Son, of Hamburg; and A. Henderson, of Pine-apple Place.

The illustration is from a plant grown by Mr. Sim.



POLYPODIUM LACHNOPODIUM.

XXXIII

Portion of mature Frond, under side.

POLYPODIUM LACHNOPODIUM.

J. SMITH. KUNZE. MOORE AND HOULSTON.

PLATE XXXIII.

Polypodium—Polypody. *Lachnopodium*—Downy-footed.

THE *Polypodium lachnopodium* is very aptly named, as it is exceedingly hairy. When properly managed, and with plenty of pot room, a handsome exhibition plant may be obtained. Unfortunately, this is another species which is procured with difficulty, although it has been in cultivation in Great Britain for the last twelve or thirteen years.

The fronds are deltoid, and bi-tripinnatifid, the pinnules being lanceolate-acuminate, and the segments oblong-linear, obtuse, hairy; the lower segments distant and pinnatifid, whilst nearer the apex they are entire; petiolate.

Stipes and rachis densely covered with scales of a reddish brown colour.

The length of the frond varies from two to four feet, the pinnæ being twelve inches long. Colour a dull green.

Rhizoma erect and caudiciform.

Veins pinnately forked.

Sori round, medial, and uniserial, numerous, but small.

An ornamental evergreen stove species from Jamaica.

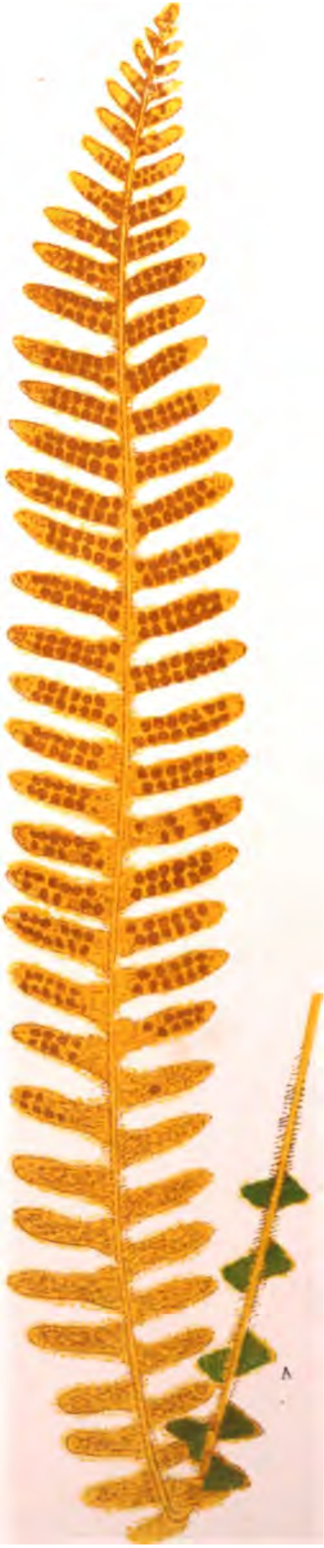
Introduced into the Royal Gardens, Kew, in the year 1843, by Mr. William Purdie.

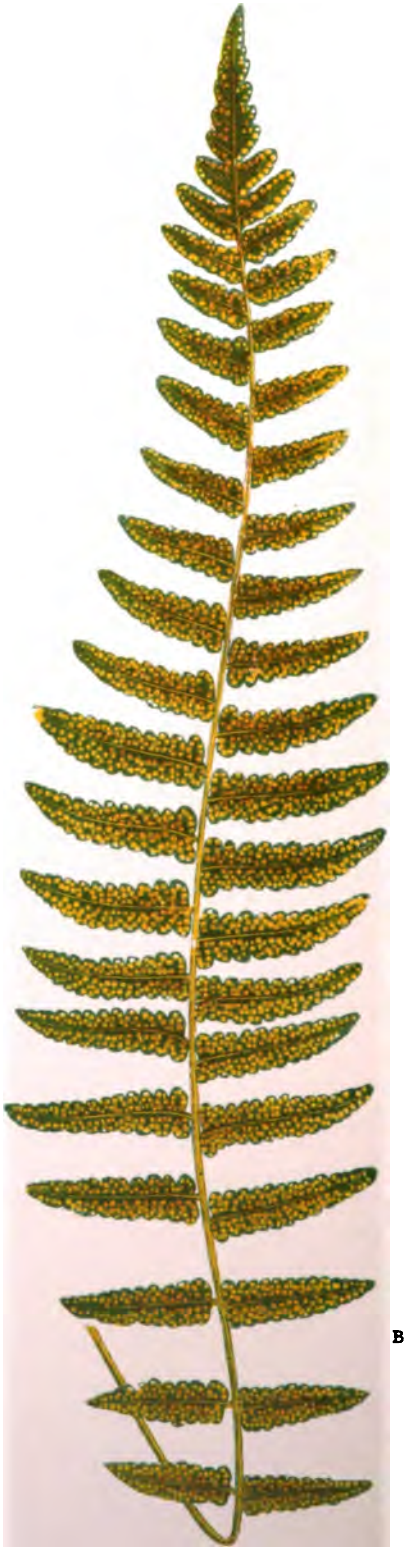
P. lachnopodium is one of those beautiful stove Ferns which should be in every collection, as its much-divided fronds and peculiar texture are a great contrast to the ordinary form of the Polypody.

My thanks are due to Mr. Henderson, of Wentworth, for a plant of this Fern; and to the same gentleman, Mr. Sim, of Foot's Cray; Mr. Norman, of Hull; and to Mr. Clarke, of the Royal Botanic Gardens, Glasgow, for fronds.

It is in the Catalogue of Mr. Robert Sim, of Foot's Cray Nursery, Kent; and this appears to be the only Catalogue which contains it.

The illustration is from a frond received from Mr. Henderson, of Wentworth.





POLYPODIUM SEPULTUM.

P. ASPLENIOIDES.

Portion of mature Frond, under side.

POLYPODIUM SEPULTUM.

KAULFUSS.

PLATE XXXIV.—A.

Polypodium hirsutissimum,	RADDI. BORY. FEE.
" *lepidopteris,*	KUNZE.
" *rufulum,*	PRESL.
Acrostichum lepidopteris,	LANGSDORFF AND FISCHER.
" "	SPRENGEL.
Goniophlebium sepultum,	J. SMITH. MOORE & HOULSTON.
Cyathea vestita,	SPRENGEL.
Marginaria rufula,	PRESL.

Polypodium—Polypody. *Sepultum*—Enclosed.

IN THE SECTION GONIOPHLEBIUM.

A DISTINCT and handsome Fern, which should be in every good collection.

Fronds lanceolate in form, pinnate, pinnæ oblong-linear, somewhat obtuse and close, sessile.

Veins internal and imperfectly seen.

Frond articulated on a white, scaly, creeping rhizoma.

Length of frond from twelve to eighteen inches; deep green in colour, yet so densely covered with narrow fimbriated scales as to give the frond a whitish appearance.

Sori situated on the upper half of the frond; uniserial, circular, very large, and yellowish red, protruding through the white scales. Sori very conspicuous, and eventually becoming confluent.

An elegant South American Fern, especially Brazil.

An evergreen stove species.

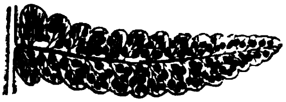
Introduced into the Royal Gardens, Kew, by Mr. Gardner, in the year 1841.

Seldom seen except in large collections, and apparently rare.

It is in the Catalogues of Messrs. Rollisson, of Tooting; A. Henderson, of Pine-apple Place; Parker, of Holloway; and Booth and Son, of Hamburg.

I am indebted to Mr. Henderson, of Wentworth; to Mr. Norman, of Hull; and to Messrs. Booth, of Hamburg, for fronds of this beautiful species.

The illustration is from a frond forwarded by Mr. Henderson, of Wentworth.



Portion of mature Frond, under side.

POLYPODIUM ASPLENIOIDES.

SWARTZ. KUNZE. WILLDENOW. SLOAN.

PLATE XXXIV.—B.

Polypodium compositum,	LINK.
" *reptans,*	KAULFUSS.
Goniopteris asplenioides,	LINK. PRESL. J. SMITH.
" "	FEE. MOORE AND HOULSTON.

Polypodium—Polypody. *Asplenioides*—Asplenium-like.

IN THE SECTION GONIOPTERIS OF AUTHORS.

Polypodium asplenioides is a pretty and very distinct species, deserving a more extended cultivation that it appears to have.

A native of the American meridian, Jamaica and Brazil.

Introduced into the Royal Gardens, Kew, in the year 1841, by Messrs. Loddiges, of Hackney.

An evergreen stove Fern.

The fronds, which are lanceolate in form, are pinnate, the pinnæ being pinnatifid, oblong-obtuse, with a somewhat cordate base; rugose, pubescent; terminal, adherent to a short creeping rhizoma.

Length of frond about twelve inches; colour a dull green.

The sori numerous, medial, or sub-terminal, eventually becoming confluent, and covering the whole under surface from the base to the apex of the frond. Colour yellowish red.

Petiolate, except near the apex of the frond.

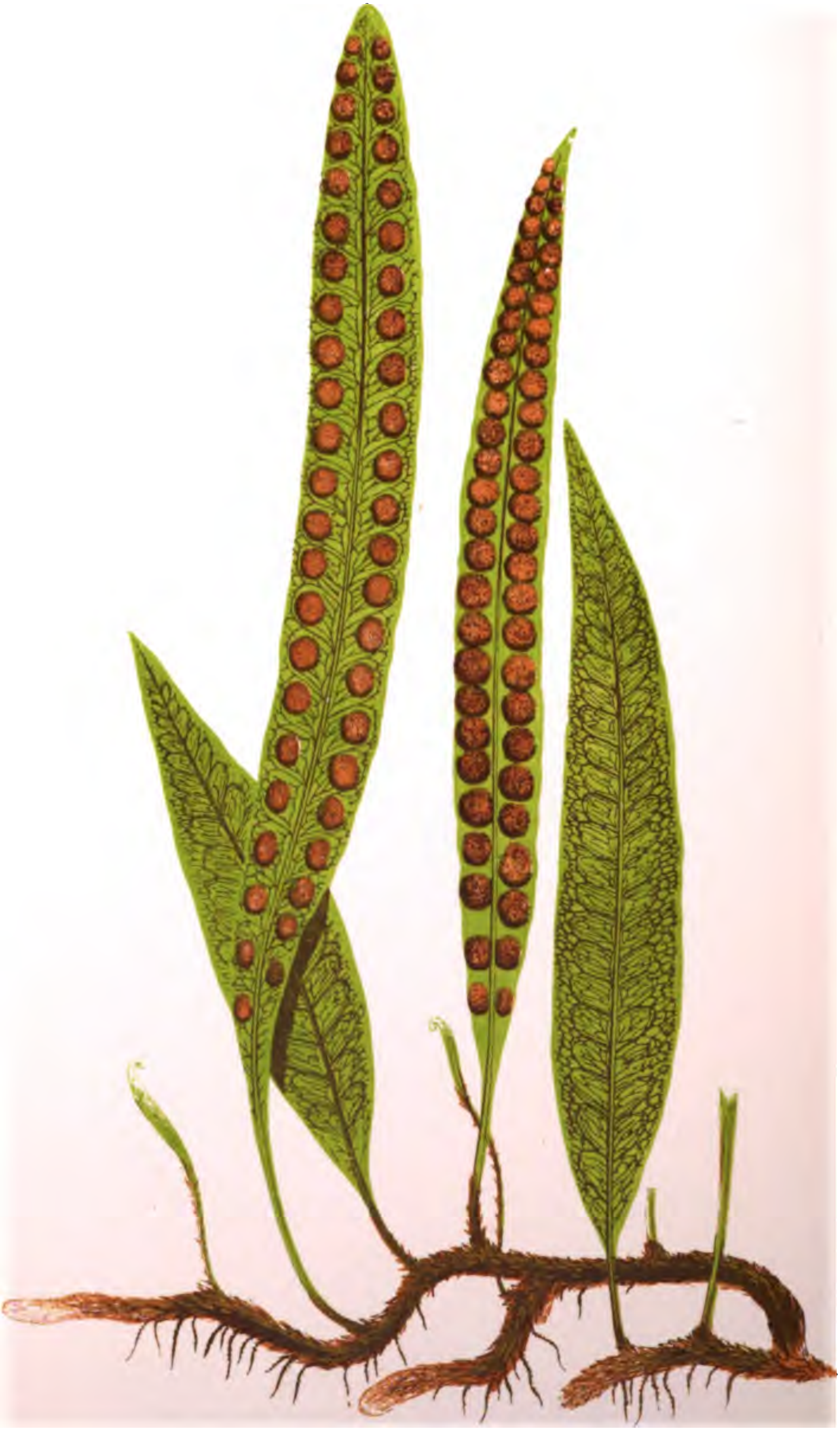
The present species is one of my desiderata.

Best known in England as the *Goniopteris asplenioides.*

My thanks are due to Mr. Henderson, of Wentworth, and to Mr. Norman, of Hull, for fronds.

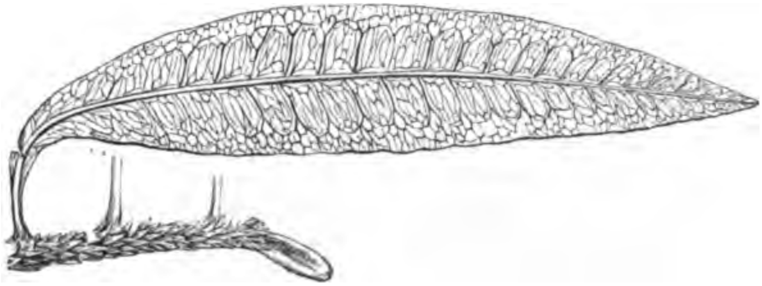
It is in the Catalogues of Mr. Kennedy, of Covent Garden, and Mr. Parker, of Hollway.

The illustration is from a frond forwarded by Mr. Norman, of Hull.



POLYPODIUM VENOSUM.

XXXV



Portion of barren Frond.

POLYPODIUM VENOSUM.

Lowe.

PLATE XXXV.

Phlebodium venosum,	Moore and Houlston.
" "	Of Gardens.
Polypodium stigmaticum,	Presl.
" ***hænkeanum,***	Sprengel.
Pleopeltis stigmatica,	Presl.
" ***venosa,***	Moore.

Polypodium—Polypody.

Venosum—Veined.

In the Section Phlebodium of some Authors, and Pleopeltis of others.

Amongst a tribe of plants whose beauty depends upon the peculiarity of the leaf, either in form, colour, or in the marking of the veins, any striking appearance is welcomed by the cultivator. In the present instance, the *Polypodium venosum* is a pretty dwarf species, rendered beautiful by the exquisite marking of the veins; a feature so conspicuous as to cause universal admiration.

A native of South America.

It is an evergreen stove species, which seems to flourish best when grown in a suspended basket of moss and broken pot, mixed with a rich light soil. The creeping rhizoma, when the plant is treated in this manner, will spread itself all round the basket, bearing numbers of beautiful fronds.

There are two forms of frond. The sterile frond is simple, of an oblong-lanceolate shape, undulated, and attenuated at the base; the colour is dull green with dark veins, which are conspicuous. The fertile frond is also simple and undulated, and attenuated at the base; it is mostly contracted to half the width of the barren frond, being linear-lanceolate in form.

Both forms of frond are from five to eight inches in length, and are scaly on the rachis and stipes. Fronds lateral, attached to a scaly, creeping, cæspitose rhizoma, which eventually becomes much branched.

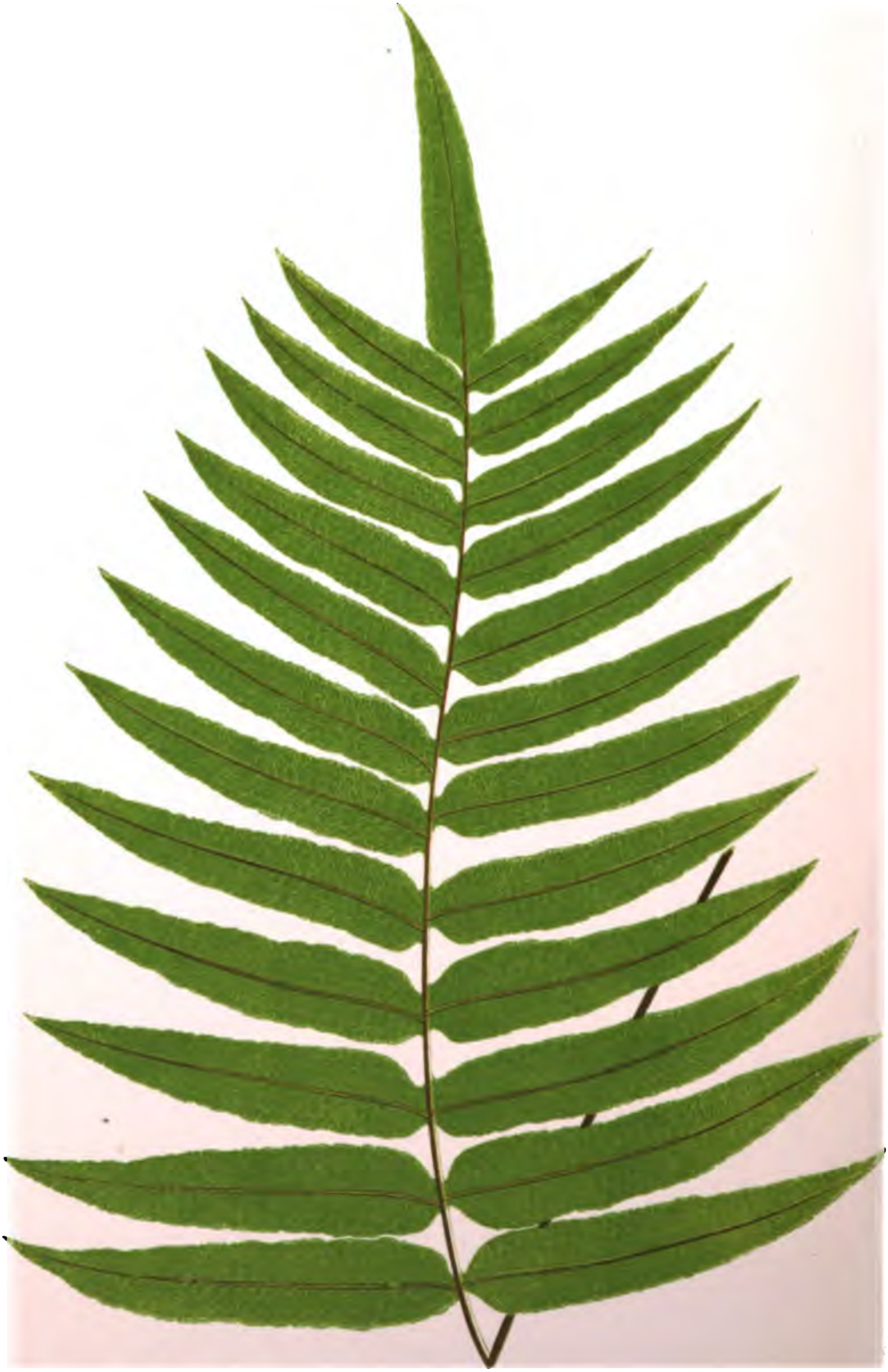
Sori uniserial, oval in form and yellowish in colour, very prominent, being raised in rounded heaps which almost touch the midrib and edge of the frond; the upper side of the frond is indented with the sori, and is prettily marked around where it is situated.

Best known as the *Phlebodium venosum* in English gardens.

My thanks are due to Mr. Henderson, of Wentworth; Mr. Moore, of the Chelsea Botanic Gardens; Mr. Lamb, gardener to F. Wright, Esq., of Osmaston Manor; Messrs. Booth and Son, of Hamburg; and to Mr. E. Cooling, of Derby, for plants of this species.

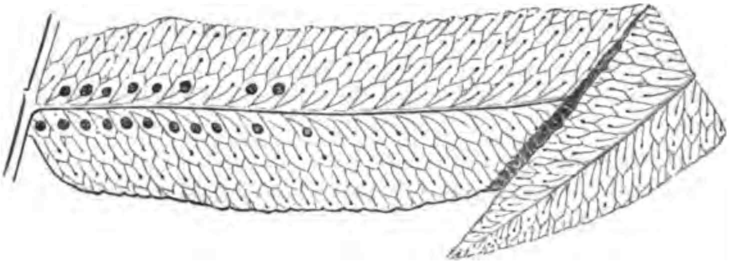
It is in the Fern Catalogues of Messrs. Booth and Son, of Hamburg; A. Henderson, of Pine-apple Place; Mr. Robert Sim, of Foot's Cray; Masters, of Canterbury; E. Cooling, of Derby; Robert Parker, of Holloway; Messrs. Rollisson, of Tooting; and Veitch, of Chelsea.

The illustration is from a plant sent by Mr. Lamb, of Osmaston Manor.



POLYPODIUM ALBO-PUNCTATUM.

XXXVI



Portion of mature Frond.

POLYPODIUM ALBO-PUNCTATUM.

RADDI.

PLATE XXXVI.

Goniophlebium albo-punctatum,	J. SMITH. FEE.
" "	MOORE AND HOULSTON.

Polypodium—Polypody. *Albo-punctatum*—White-spotted.

IN THE SECTION GONIOPHLEBIUM OF AUTHORS.

A GRACEFUL pendulous Fern, with broad handsome fronds; easily grown and well worthy of universal cultivation. The substance of the frond is very thin; it consequently requires great care in the drying and pressing of the fronds for the herbarium.

A native of Brazil.

An evergreen stove species.

The form of the frond is broadly lanceolate, pinnate, the pinnæ being lanceolate-acuminate, nearly entire, undulated, and membranous; the superior base truncate, whilst the inferior base is adnate. The upper pinnæ sessile.

The upper surface of the frond has small white scales scattered over it.

Fronds lateral, being articulated on a rhizoma which is scaly and creeping.

Length of frond from two to three feet; colour pale dull green.

Sori uniserial.

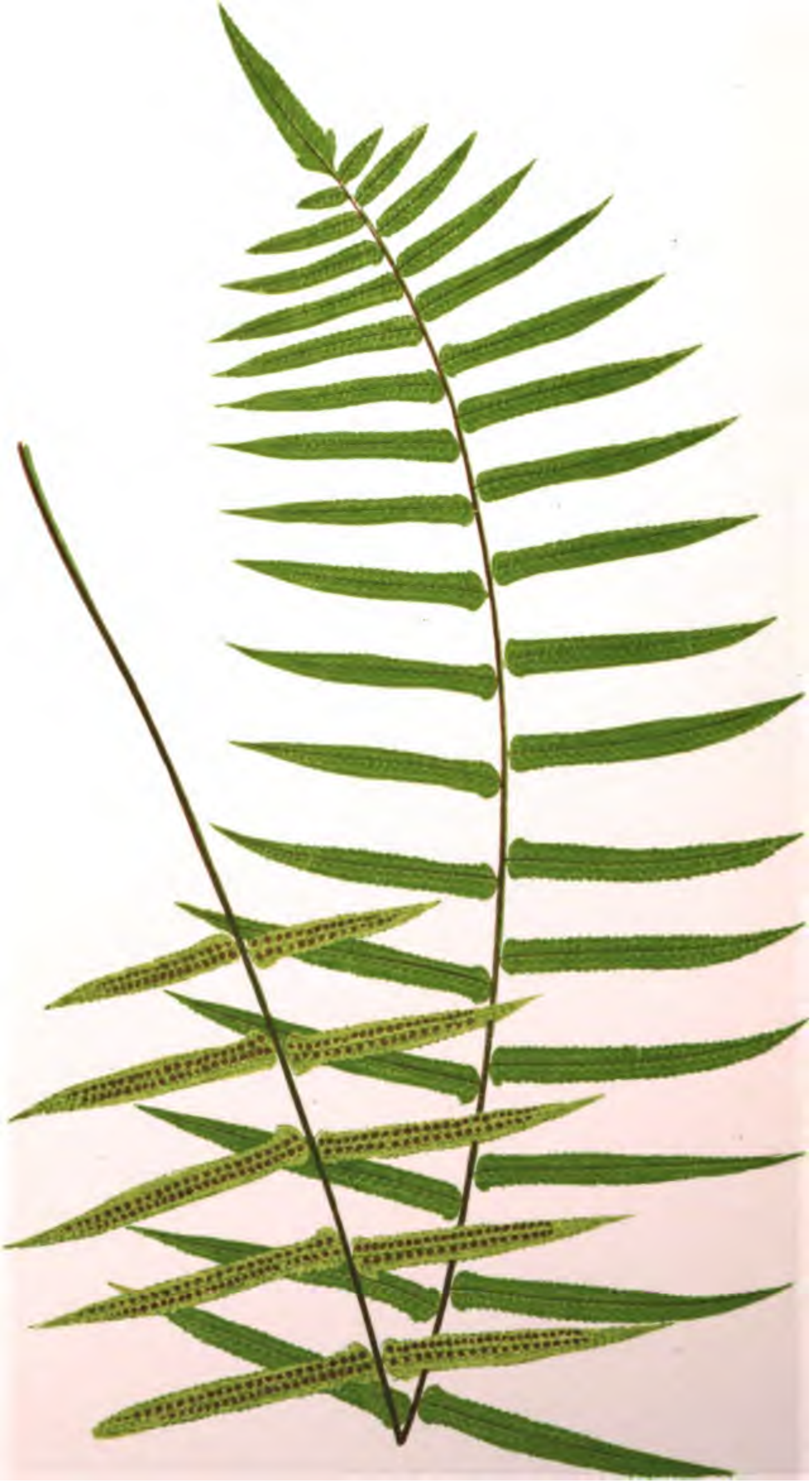
Received at the Royal Gardens, Kew, from Mr. Henderson, in the year 1842.

Best known as the *Goniophlebium albo-punctatum.*

I am indebted to Mr. Masters, of the Exotic Nursery, Canterbury, and to Mr. Wraight, of Newlands, for plants of this species: and to Mr. Henderson, of Wentworth, and Mr. Norman, of Hull, for fructified fronds.

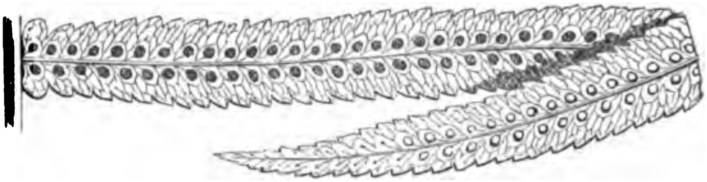
It is in the following Nurserymen's Catalogues:—Booth, of Hamburg, and Masters, of Canterbury.

The illustration is from a plant in my own collection.



POLYPODIUM SUBAURICULATUM

XXXVII



Portion of mature Frond.

POLYPODIUM SUBAURICULATUM.

BLUME. ?

PLATE XXXVII.

Polypodium reinwardti,	Kunze.
Goniophlebium reinwardti,	R. De Vriese.
" *subauriculatum,*	Presl. Moore and Houlston.

Polypodium—Polypody.
Subauriculatum—Nearly eared.

IN THE SECTION GONIOPHLEBIUM OF AUTHORS.

When well grown the *Polypodium subauriculatum* is a truly magnificent Fern, being strikingly distinct from all others. Its very long slender fronds and weeping habit give it a remarkable and pleasing appearance. A rather delicate Fern. There is a magnificent plant in the Royal Gardens, Kew, and another fine specimen at Wentworth.

A stove species: an evergreen herbaceous Fern.

Introduced at Kew in 1848.

From Java and Luzon.

The fronds are pinnate, lanceolate, and slender, the pinnæ being long, narrow, membranous, and lanceolate-acuminate in shape; the pinnæ are articulated with the rachis, serrated on the edges, and sub-auriculate at the base.

The length of the frond from four to eight feet; the colour bright green; habit pendulous.

Rachis and stipes pubescent, brown, articulated with a creeping rhizoma; rhizoma scaly.

Sori uniserial, of a yellowish brown colour, each furnished with many laciniated scales, which are soon hidden by the swelling of the sori. The sori are immersed in the frond, and form raised protuberances on the upper surface.

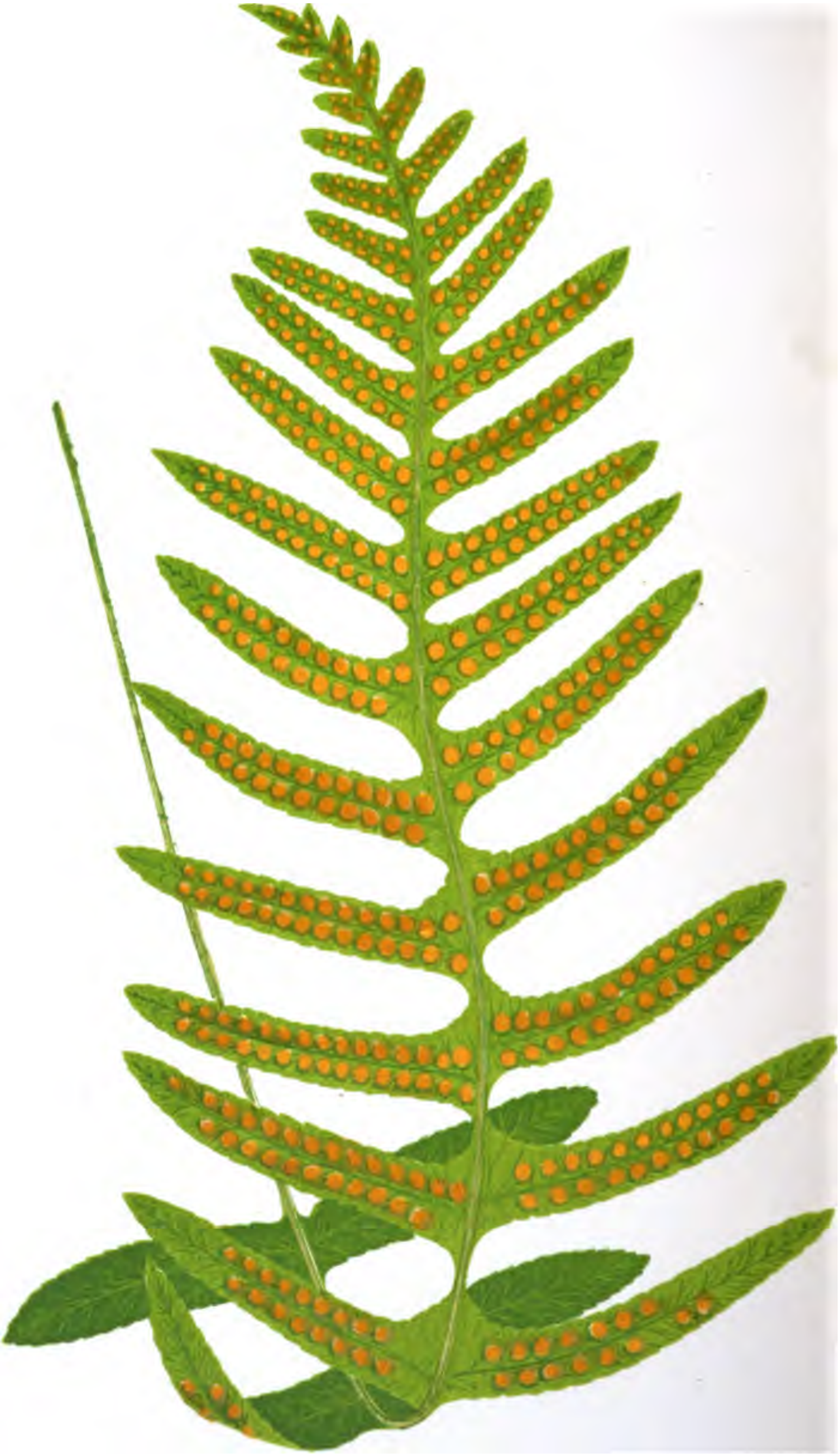
Mr. Moore, in his "Genera and Species of Cultivated Ferns," mentions the magnificent plant of this species which is in the Kew collection, and when described by Mr. Moore, it had nearly twenty developed fronds, a portion of which were eight feet long, and having fifty-eight pairs of pinnules, with a stipes not more than eight inches long.

Best known as the *Goniophlebium subauriculatum.*

I am indebted to Messrs. Rollisson, of Tooting, for a plant of this species; and to Mr. Henderson, of Wentworth; Mr. Ingram, of the Royal Gardens, Windsor; and to Mr. Norman, of Hull, for fronds.

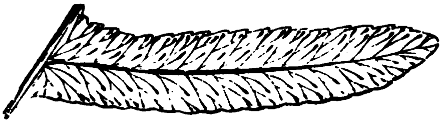
It is in the Catalogue of Messrs. Rollisson, of Tooting.

The illustration is from a frond sent by Mr. Norman, of Hull.



POLYPODIUM VULGARE.

XXXVIII



Portion of mature Frond, upper side.

POLYPODIUM VULGARE.

LINNÆUS. LIGHTFOOT.
HUDSON. WITHERING. SMITH. MACKAY. FRANCIS.
NEWMAN. BABINGTON. HOOKER AND ARNOTT.
MOORE AND HOULSTON. DEAKIN. SOWERBY. SCHKUHR.
WILLDENOW. SPRENGEL. PRESL. FEE.

PLATE XXXVIII.

Polypodium canariense,	WILLDENOW.
“ *viterbiense,*	BOCCONE.
Polipodium vulgare,	BOLTON.
Polypodium karwinskianum,	BRAUN.
“ *ctenopteris vulgare,*	PRESL.
“ *virginianum,*	OF GARDENS. MORISON.
“ *cambricum,*	LINNÆUS.
“ *intermedium,*	HOOKER AND ARNOTT.
Ctenopteris vulgaris,	NEWMAN.

Polypodium—Polypody. *Vulgare*—Common.

ONE of the commonest and most universally distributed Ferns in the temperate regions, flourishing in our hedgerows, on rocks, walls, and stumps of trees; it may justly be called a parasite, which seeks to hasten to destruction those trees where decay has made its appearance. This Fern is subject to variety from seed, some of which are so dissimilar from the typical form, that it requires the knowledge of the Botanist to point out that these distinct varieties belong to *Polypodium vulgare*. Amongst these may be mentioned the *P. cambricum* of Linnæus, and the Dargle Fern of Mackay, the *P. semilacerum*, known also as *P. hibernicum*.

Amongst the numerous countries in which the *P. vulgare* is an inhabitant, the following may be mentioned:—Scandinavia, Sardinia, Sicily, Italy, Corfu, Madeira, Canary, Algiers, Erzeroum, Kamtschatka, Canada, United States, Mexico, Guatemala, California, France, Germany, Switzerland, Channel Islands, England, Scotland, Wales, Ireland, etc.

Fronds lateral, pinnatifid with lanceolate segments, obtuse, the margin crenulate. Venation circinate, having a branched and creeping rhizoma clothed with scales. Stipes frequently as long as the frond. Veins much branched, having their apices club-shaped.

Length of frond variable, differing from two to eighteen inches. Colour dull green.

Sori confined to the upper portion of the frond, circular, a single row on each side of the lobes. Terminal.

Spores and spore-cases yellow or orange-coloured, giving the under side of the frond an interesting appearance.

An evergreen hardy British species, which is small, and grows erect in dry situations, yet considerably larger and drooping in more moist localities.

Some of the varieties are bipinnatifid.

The "Common Polypody" is found in Great Britain at every elevation from the sea-level to two thousand one hundred feet.

This well-known species is easily propagated by divisions of the rhizoma.

The localities of *Polypodium vulgare* in Great Britain are too numerous to mention, it being one of our most common species.

To cultivate this Fern it is requisite to procure a light soil, and in planting care should be taken not to bury the rhizoma, as it delights to have it on the surface of the soil; pieces of decaying wood amongst the soil is an advantage, as it seems to delight in and to flourish best with this addition.

VARIETIES OF POLYPODIUM VULGARE.

Mr. Moore, in the "Nature-printed Ferns," gives the following: —*Semilacerum*, Link, (*hibernicum* of Moore and Sowerby, *sinuatum* of Francis, *cambricum* of Smith, and *serratum* of some authors;) *cambricum*, Willdenow, Bolton, Smith and Moore, (*laciniatum* of Lamarck;) *acutum*, *bifidum*, *ramosum*, *interruptum*, *sinuatum*, *laciniatum*, *marginatum*, *serrulatum*, *multifidum*, *auritum*, *serratum*, *denticulatum*, *ovatum*, *crenatum*, and *truncatum*.

Of these varieties, *semilacerum* is an Irish Fern above alluded to; *cambricum*, a very beautiful form, originally, I believe, found in Wales; I have a plant procured in a wood near Macclesfield, which does not differ from the form *cambricum*. *Bifidum* is not constant in cultivation; several beautiful plants procured at Matlock have nearly lost this bifid character since I have had them under pot culture, and others planted in the open Fernery have entirely lost this character. When gathered, they were divided almost to the apex. In a wood near Cromford, Derbyshire, I came upon a patch, half a dozen yards square, of *bifidum*, in the year 1853. *Ramosum* is very rare; *serrulatum* was found in Devonshire, by Mr. Wollaston; *denticulatum* near Hereford; *ovatum* in Ireland, by Dr. Allchin; *crenatum* in Kent, Surrey, and Wales; *truncatum* in Ireland, by Dr. Allchin.

For further particulars of these varieties the reader is referred to the excellent descriptions in Moore's "Nature-printed Ferns of Great Britain." The great length of the "Natural History of Ferns" will not allow more than a passing notice of the varieties.

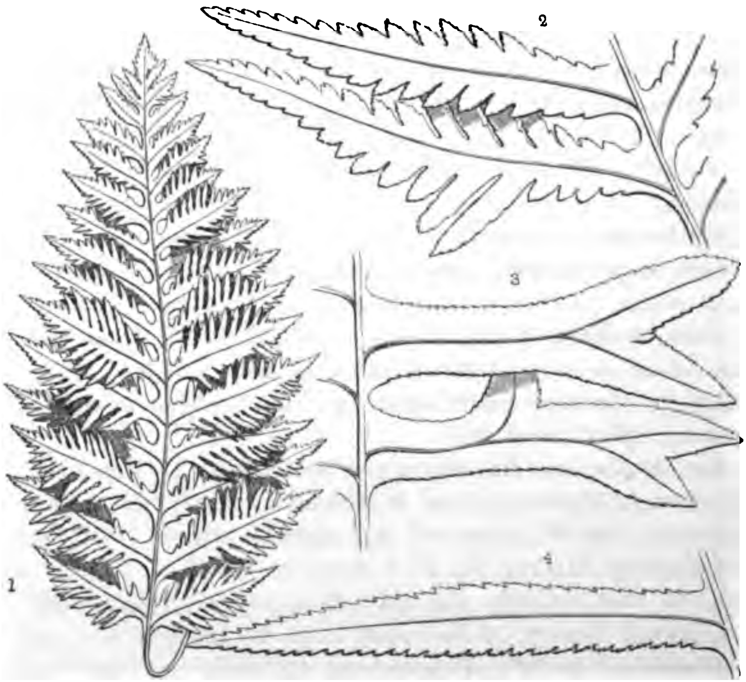
My brother, Captain A. S. H. Lowe, found, this spring, 1856, a very large variety, somewhat resembling *semilacerum*, on a small island (Carberry Island) in Loch Ree, three miles from Athlone, Ireland, whose fronds exceeded two feet in length. The island is only about six acres in size, and is woody and rocky; in the very centre of it were large patches of this Fern growing upon the rocks.

My thanks are due for plants and fronds of this Fern, to Mr. Joseph Sidebotham, of Manchester; Mr. R. T. Millett, of Penzance; Mr. W. Allen, of Nottingham; Mr. W. Winstanley, of Chaigeley Manor; Mr. R. J. Gray, St. Thomas', Exeter; Mr. Sim, of Foot's Cray; and Mr. Norman, of Hull. Also to Sir Oswald Mosley, of Rolleston Hall, for plants of the variety *semilacerum;* to Mr. Pearson, of Chilwell, for the variety *serratum;* to Mr. Sidebotham, of Manchester, and to Mr. Pearson, of Chilwell, and to Mr. Booker, of Matlock, for the variety *cambricum*. And for fronds of the varieties to Mr. G. B. Wollaston, of Chiselhurst.

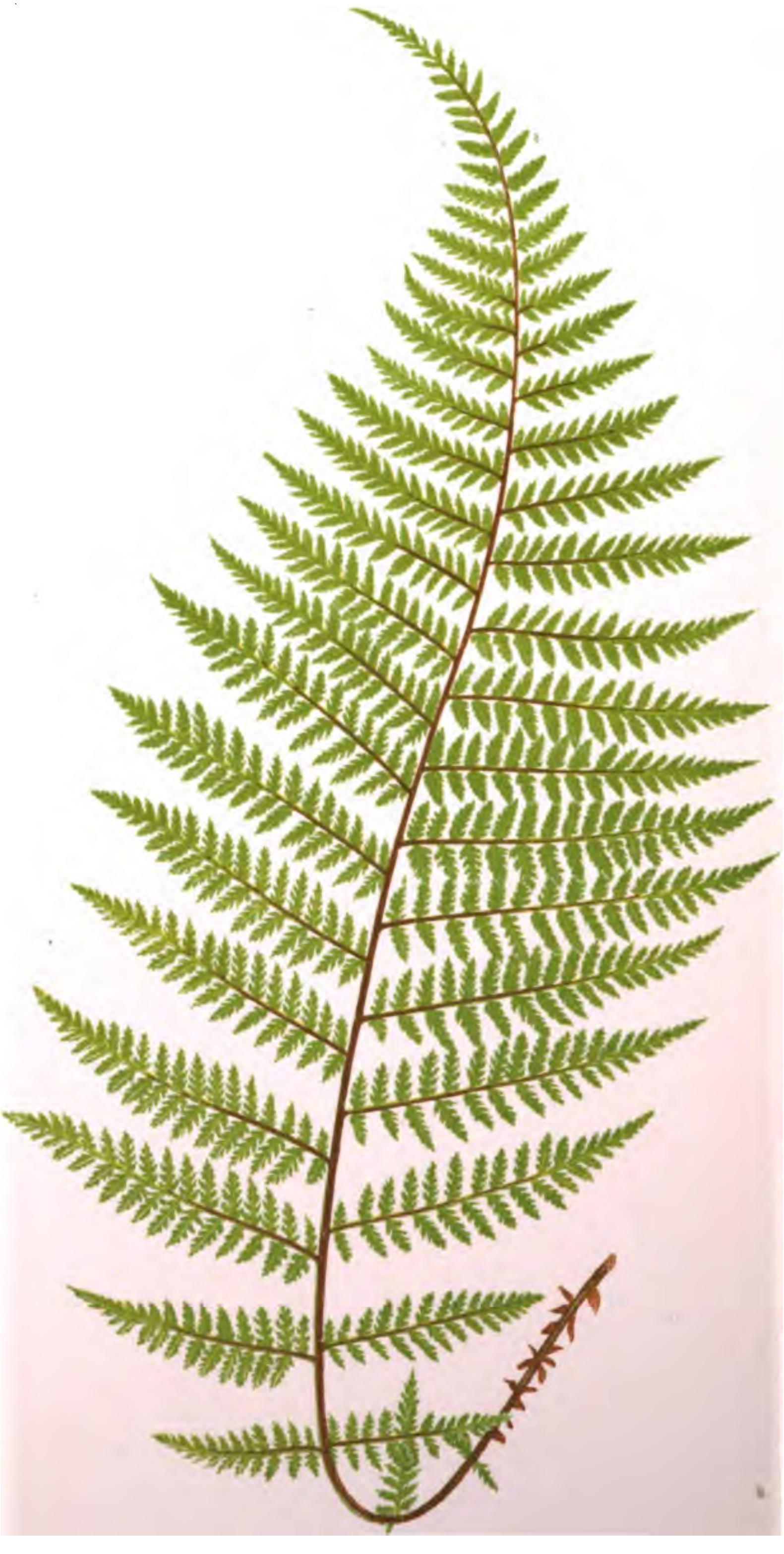
The coloured illustration is from a plant sent by Mr. Gray, of Exeter; and the varieties are from fronds sent by Mr. Wollaston, of Chiselhurst, and from plants in my own collection.

The North American Fern, *P. virginianum*, and the Madeira Fern, *P. canariense*, are evidently forms of *P. vulgare*, whose geographic range is very great. Plants of *P. virginianum* and *P. canariense* were forwarded by Mr. Sim, of Foot's Cray.

The following Nurserymen can supply plants of this species and its varieties:—Mr. Veitch, of Chelsea; E. G. Henderson, of St. John's Wood; A. Henderson, of Pine-apple Place; Rollisson, of Tooting; Booth and Son, of Hamburg; Parker, of Holloway; Cooling, of Derby; Sim, of Foot's Cray; Bass and Brown, of Sudbury, Suffolk; Kennedy, of Covent Garden; Pearson, of Chilwell; and Mc'Intosh, of the Botanic Gardens, Madeira.

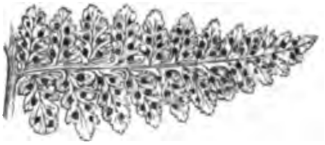


1.—P. cambricum.
2.—P. semilacerum.
3.—P. bifidum.
4.—P. serratum.



POLYPODIUM ALPESTRE.

XXXIX



Portion of mature Frond, under side.

POLYPODIUM ALPESTRE.

Koch. Godet. Moore. Hoppe. Sprengel. Henfrey. Sowerby.

PLATE XXXIX.

Polypodium rhæticum,	Pallas. Fries. Ledebour.
“ “	Woods, *(not of* Linnæus.)
Aspidium alpestre,	Schkuhr. Hoppe. Swartz.
“ *rhæticum,*	Swartz. Willdenow.
“ *distantifolium,*	Tusch.
Pseudathyrium alpestre,	Newman.
“ *flexile?*	Newman.
Athyrium alpestre,	Rylands.

Polypodium—Polypody. *Alpestre*—Alpine.

There is a peculiar interest attached to this very elegant Fern, from having been so recently discovered as a British species. The similitude of the Alpine Lady Fern to the *Asplenium filix-fœmina* no doubt was the cause of this species being entirely overlooked, although now it is found to be in some of its Scotch habitats exceedingly abundant. In 1841 Mr. Watson gathered it on the mountain Ben Aulder, in Invernesshire; and in 1844 a frond was brought from Canlochen Glen, in Forfarshire. In 1852 Mr. T. Westcombe and Mr. Backhouse procured it in great abundance in Canlochen, in

Glen Prosen, Glen Fiadh, and in all the Dee-side mountains. Mr. Backhouse says that at an elevation of from two to three thousand feet it was frequently mingled with *A. filix-fœmina,* yet from three to four thousand feet *filix-fœmina* ceased, whilst *Polypodium alpestre* remained in abundance, flourishing most in the more open situations.

Mr. Newman describes another Fern under the name of *Pseudathyrium flexile,* which has more of a *Cystopteris*-look about it than the *Polypodium alpestre,* and may possibly be a different species; in the absence of both plants and fronds I am unable to say more about it than that some authors consider it a variety of *P. alpestre.* It appears to be abundant in Glen Prosen, Forfarshire—the only habitat as yet discovered.

P. alpestre is a native of Norway, Sweden, Switzerland, Germany, Russia, Scotland, Lapland, and in the Caucasus.

The fronds, which are bipinnate, are lanceolate in form; pinnæ narrow and lanceolate, wide at the base, segments serrate, oblong, and blunt. Veins flexuose. Frond widest in the middle, becoming narrowest at both the base and apex.

Length of frond varying from one to three feet; colour a heavy dark green.

Fructification on the upper two thirds of the frond. Sori small, round, occasionally crowded and confluent.

A deciduous, perennial, herbaceous, hardy Fern.

Caudex short and thick, stipes short, usually about one fifth of the frond's length, thinly covered with light brown scales. Rachis stout.

Mr. Moore, in his "Nature-printed Ferns," places the Fern which Mr. Backhouse found, and which Mr. Newman has called *Pseudathyrium flexile,* as a variety of the Alpine Polypody, remarking that it is very distinct, and that it may prove to be a new species. There is an excellent figure given in "The Nature-printed Ferns," (Plate VII.) It is more slender and flaccid, the pinnæ are shorter, and the pinnules less in number. Stipes exceedingly short; length of frond from six to eighteen inches. Sori usually from six to eight on a pinnule.

Mr. Moore describes three varieties, namely:—*flexile,* found by Mr. Backhouse, in Glen Prosen, Forfarshire, and not known from any other locality; *lanceum,* Clova Mountains, found by Mr. G. Lawson, and Lochnager, Aberdeenshire, by Mr. Croall;

tripinnatum, found by Mr. G. Lawson at the Wells of Dee, in Aberdeenshire.

In cultivation the plant requires plenty of air, and a shady situation, and to be grown in a sandy loam with peat.

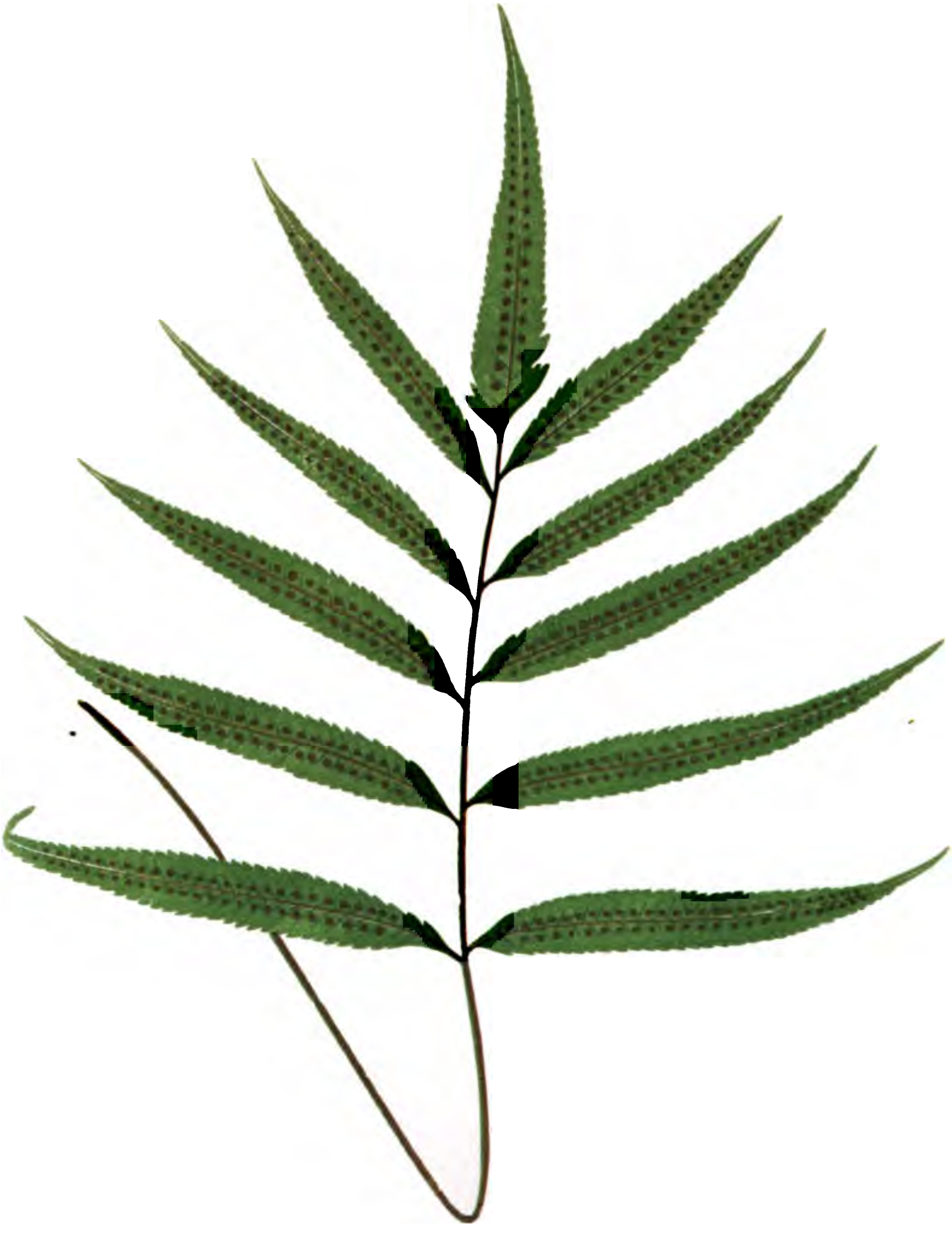
This recently-discovered yet abundant Scotch Fern, should be found in every collection. Although it is a species only recently discovered, its great abundance has rendered it a Fern which may be purchased at a reasonable price.

It has much the appearance of *Asplenium filix-fœmina*, hence its very recent discovery, owing to its being overlooked, even by botanists, for that species.

It is in the following Nurserymen's Catalogues:—Messrs. Kennedy, Covent Garden; Sim, of Foot's Cray; Osborn, of Fulham; Parker, of Holloway; E. G. Henderson, of St. John's Wood; Veitch, of Chelsea; and Rollisson, of Tooting.

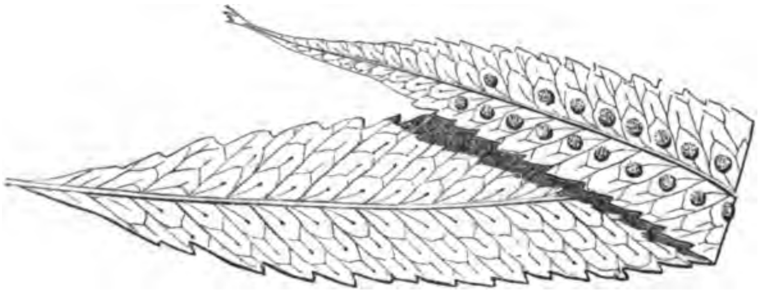
My thanks are due to Messrs. Rollisson, of Tooting; Mr. G. Lawson, of Edinburgh; Mr. Norman, of Hull; and to Messrs. Backhouse, of York, for plants and fronds of this species.

The illustration is from a plant gathered in Lochnager, Aberdeenshire, in August, 1854, by Mr. G. Lawson.



POLYPODIUM GLANDIDENS.

XL



Pinna of mature Frond.

POLYPODIUM GRANDIDENS.

KUNZE.

PLATE XL.

Goniophlebium argutum,	J. SMITH. WALLICH, (*not of*
" "	BLUME.) FEE.

Polypodium—Polypody. *Grandidens*—Large-toothed.

IN THE SECTION GONIOPHLEBIUM OF AUTHORS.

No collection should be without this magnificent, yet uncommon Fern. Its graceful pendulous habit, rich green colour of the fronds, together with the exquisitely serrated edges, and prominent sori, produce a very pleasing effect. In general appearance it is so strikingly distinct from all others, that it must always rank amongst our most desirable Ferns.

Received at the Royal Gardens, Kew, in 1845, from the Messrs. Loddiges.

An evergreen stove Fern.

A native of Nepal.

The fronds slender, shining, and glabrous, varying from two to three feet in length; colour a rich dark green. The fronds are pinnate, of a lanceolate form, the pinnæ being somewhat membranous, and lanceolate-acuminate. They are much serrated, being decurrent at the base, and articulated with the rachis. The apices of the veinlets swollen and very pale in colour, giving a spotted appearance to the frond.

The sori, which are large, and of a yellowish colour, eventually becoming brown, are uniserial, about forty pairs, each provided with a number of laciniated scales, which the swelling sori speedily obliterate.

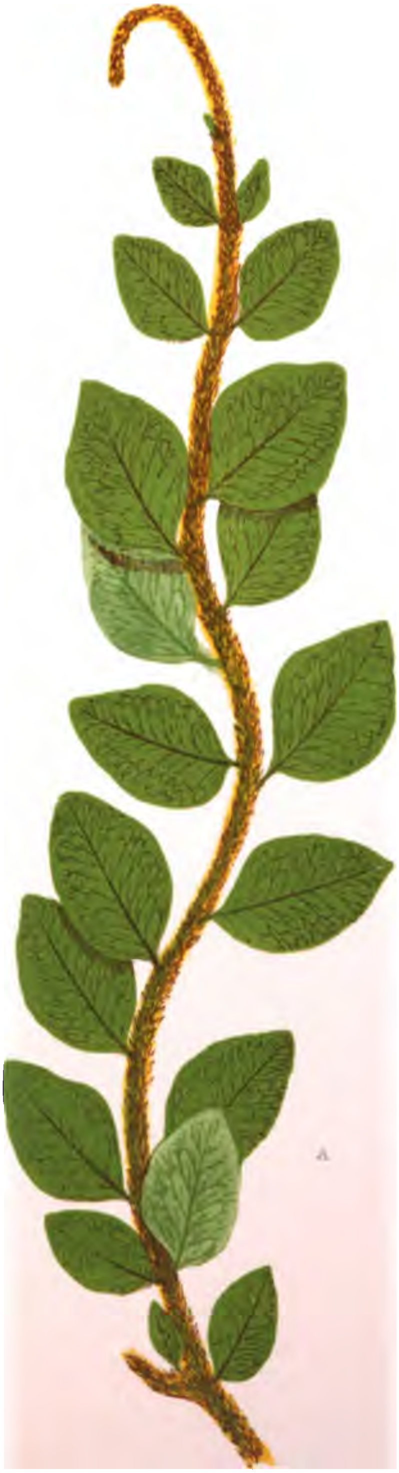
Sori immersed in the frond, producing elevated protuberances on the upper surface.

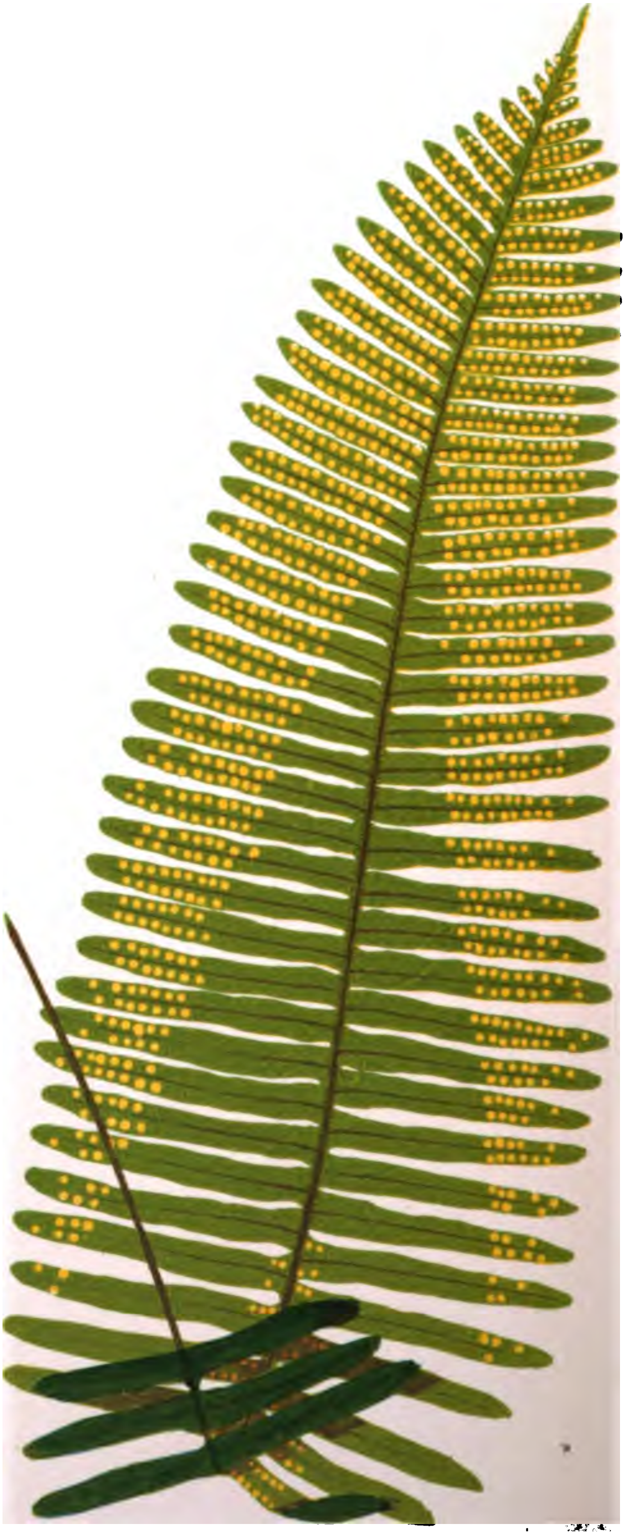
Best known in England as the *Goniophlebium argutum.*

Messrs. Booth, of Hamburg, forwarded a plant of this species, and Mr. Norman, of Hull, a frond.

It does not appear in any of the English Nurserymen's Catalogues; it is in that of Messrs. Booth, of Hamburg.

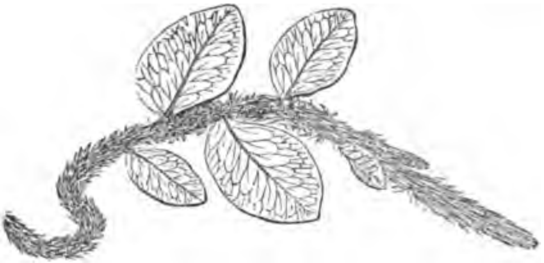
The illustration is from the plant in my own collection. Usually the frond has more pairs of pinnæ than the one figured.





[illegible] SMITH [illegible] LUNULA.

XLI



Portion of young Frond, upper side.

POLYPODIUM VACCINIFOLIUM.

LANGSDORFF AND FISCHER. KUNZE. WILLDENOW.
RADDI. KAULFUSS. SPRENGEL. CHAMISSO.

PLATE XLI.—A.

Polypodium lagopodioides,	DESVAUX. JACQUIN.
" *buxifolium,*	OF GARDENS.
Goniophlebium vaccinifolium,	J. SMITH. MOORE & HOULSTON.
Marginaria vaccinifolia,	PRESL.
" *serpens,*	PRESL.
Craspedaria vaccinifolia,	LINK.
" *lagopodioides,*	FEE.

Polypodium—Polypody. *Vaccinifolium*—Whortle-berry leaved.

IN THE SECTION GONIOPHLEBIUM OF AUTHORS.

THIS interesting diminutive species is deserving of extended cultivation. When properly managed it becomes a conspicuous object in the Fern house. Those dwarf species, of which the present Fern, and *Polypodium piloselloides,* figured in Plate XXXII, are examples, appear to flourish best when allowed to creep up the trunk of a decaying tree; if therefore a portion of a decaying tree be placed in a pot, with a small portion of light compost around it, in which the Fern is planted, it will soon creep around it like ivy, and form an interesting plant.

Introduced into the Royal Gardens, Kew, by Mr. D. Cameron, in the year 1841.

A native of the American meridian, West Indies, Brazil, and St. Catherine Island.

An evergreen stove species.

P. vaccinifolium bears both fertile and sterile fronds, yet it seems doubtful whether any one has succeeded in growing fertile fronds in this country. In gardens the present species is sometimes seen under the name of *P. lycopodioides*, the Fern of this name of Linnæus, Schkuhr, Plumier, and Fee is a *Drynaria*, probably it may be a corruption from *P. lagopodioides* of Jacquin and Fee.

The sterile fronds are glabrous, they are simple, of a rounded-oblong form, being decurrent at the base. The colour dark green, and their height only half an inch. The fertile fronds, which I have not seen, are described by Mr. Moore as simple, linear, glabrous, also decurrent at the base, and are two inches in length. Both barren and fertile fronds are lateral, and are articulated upon a creeping rhizoma, which is thick, brown, and densely covered with scales.

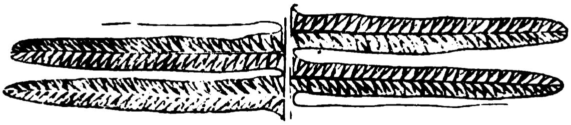
Sori terminal and uniserial.

Best known as the *Goniophlebium vaccinifolium*.

My thanks are due to Mr. Ingram, gardener to Earl Brownlow; and to the Curator of the Cambridge Botanic Gardens for plants of this species; and to Mr. Henderson, of Wentworth, for fronds.

It is in the Fern Catalogues of Messrs. Rollisson, of Tooting; Veitch, Jun., of Exeter; Cooling, of Derby; Masters, of Canterbury; and Booth and Son, of Hamburg.

The illustration is from a specimen forwarded by Mr. Henderson, of Wentworth.



Portion of mature Frond, upper side.

POLYPODIUM PLUMULA.

HUMBOLDT AND BONPLAND. WILLDENOW.
MOORE AND HOULSTON. KUNZE. RADDI? FEE?

PLATE XLI.—B.

Polypodium Paradisæ,	RADDI.
" *pectinatum?*	KUNZE. PLUMIER.
" "	PLUKENET. FEE. PRESL.
" "	PRESL.

Polypodium—Polypody.

Plumula—Feathered.

THE *Polypodium plumula,* or Feather-Fern, as its name so aptly defines, is perhaps the most delicate and beautiful Polypody that has been introduced into this country. It is but little known and cultivated in England, although its dwarf habit and delicately beautiful fronds render it an object of especial attraction. It is easily cultivated, and requires but little pot-room.

Kaulfuss remarks that it is difficult to define the difference between the following species:—*Paradisæ, plumula, pectinatum, otites, struthionis, taxifolium, venustum,* and *capillare;* the last five I have not seen, and probably none of them are cultivated in England. *P. Paradisæ* of Langsdorff and Fischer appears to be very distinct, as will be seen when a figure of it is given in this work.

An evergreen stove species.

Found in the West Indies and South America.

The form of the frond is lanceolate, sub-pinnate, with numerous linear parallel horizontal pinnæ—about fifty-five pairs of pinnæ on a frond ten inches in length.

The frond, which is lateral, is articulated on a creeping rhizoma. The bottom half of the frond is equal in width, after which it gradually tapers to a point.

Stipes and rachis black, and covered with small thin scales.

Length of frond varying from six to ten inches; colour a delicate pale green. In one, ten inches and a half in length, only two inches are naked; width of frond three inches and a quarter.

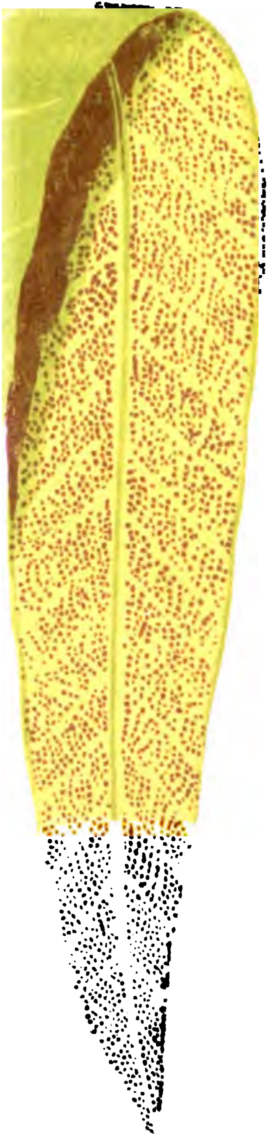
Sori uniserial, and occupying the upper portion, and sometimes the whole of the frond; colour golden yellow, situated near the edge of the frond. On a large pinna there are about thirty pairs of sori.

I have ventured to include *P. plumosum*, of Presl, as one of the synonymes of *P. plumula*, from the similarity of the fronds; it does not appear to be anywhere described, consequently it has been considered as a misprint.

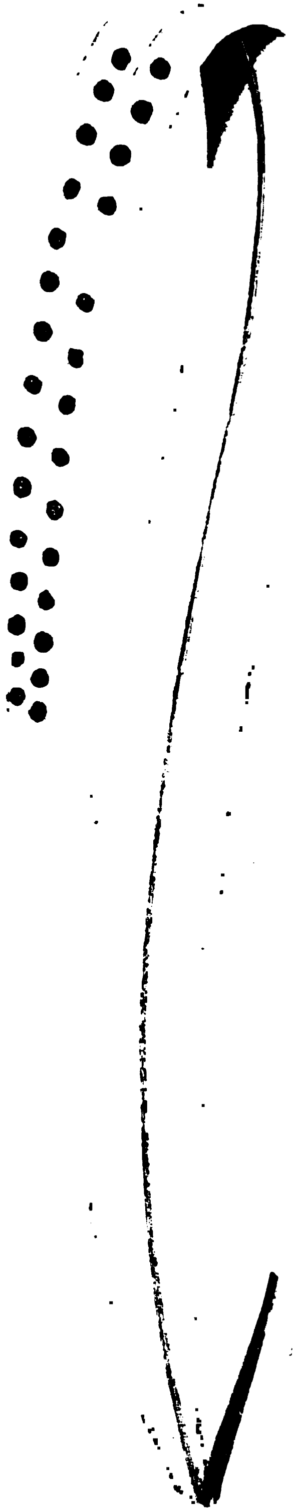
My thanks are due to Mr. Sim, of the Foot's Cray Nursery, Kent, and to Messrs. Rollisson, of Tooting, near London, for plants of this species, and to Mr. Henderson, of Wentworth, for fronds.

It is in the Fern Catalogues of Messrs. Parker, of Holloway; E. G. Henderson, of St. John's Wood; Booth and Son, of Hamburg; Rollisson, of Tooting; Sim, of Foot's Cray; A. Henderson, of Pine-apple Place; and R. Kennedy, of Covent Garden.

The illustration is from a plant in my own collection.

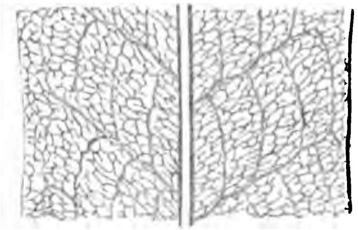


POLYPODIUM IRIOIDES.



P. FORTUNI

XLII



Portion of mature Frond, upper side.

POLYPODIUM IRIOIDES.

Poiret. Guenzius. Hooker and Greville.

PLATE XLII.—A.

Polypodium ireoides,	Lamarck. Kunze.
“ *iridioides,*	Hooker and Greville.
“ *platybasis,*	Kunze.
“ *polycephalum,*	Wallich.
Drynaria irioides,	J. Smith. R. Brown.
“ “	Hooker and Greville.
“ “	Moore and Houlston.
Microsorum irioides,	Fee.
“ *irregulare,*	Link.
Phymatodes irioides,	Presl.
“ *sessilis?*	Presl.

Polypodium—Polypody.	*Irioides*—Iris-like.

In the Section Drynaria of Authors.

A singular-looking erect-growing Fern, more nearly approaching our British *Scolopendrium vulgare* than most other species, yet differing considerably in having an upright instead of pendulous habit. The small yet very numerous sori would be anything but conspicuous, were it not for the profuse manner in which they are scattered over the frond.

This not uncommon Fern is easily cultivated, flourishing best when in a rich soil, mixed with stone or broken pot, and planted in a wide yet shallow flower-pan.

Introduced into the Royal Gardens, Kew, by Mr. A. Cunningham, in the year 1824.

A stove evergreen species.

The *Polypodium irioides* is a native of the East Indies, Mauritius, and New Holland.

This ornamental Fern has simple, fleshy fronds, oblong-lanceolate, ensiform, attenuated at the base, and frequently irregularly lobed on the margin.

Venation internal.

Length of frond from two feet to three feet and a half; colour pale green.

Fronds glabrous, lateral, and articulated on a rhizoma which is creeping and scaly.

Sori diminutive, numerous, being thickly scattered, usually only on the upper half or two thirds of the frond. Whitish at first, eventually becoming brown.

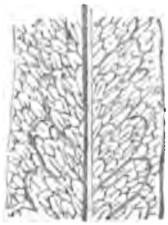
Best known as the *Drynaria irioides*.

For plants of this species I am indebted to the present Curator of the Cambridge Botanic Gardens; to Messrs. Booth and Son, of Hamburg; Mr. Norman, of Hull; and to Mr. Lamb, gardener to F. Wright, Esq., of Osmaston Manor, near Ashbourn.

Dispersed over the whole frond are black scales, closely resembling insects of a conical form, having a long pointed tail, which gives the frond a peculiar appearance.

It is in the Fern lists of Messrs. A. Henderson, of Pine-apple Place; R. Kennedy, of the Bedford Conservatories, Covent Garden; W. Rollisson and Sons, of Tooting; R. Sim, of Foot's Cray; E. Cooling, of Derby; J. Booth and Son, of Hamburg; Osborn and Son, of Fulham; Masters, of Canterbury; and Veitch, Jun., of Chelsea.

The illustration is from a plant in my own collection.



Portion of mature Frond, upper side.

POLYPODIUM FORTUNI.

Lowe.

PLATE XLII.—B.

Drynaria Fortuni, Moore.
Phymatodes Fortuni, Moore.

Polypodium—Polypody. *Fortuni*—After Fortune, the Botanist.

In the Section Drynaria of Authors.

The *Polypodium Fortuni* is a rare and but recently-introduced species.

We are indebted to Mr. Henderson, of Wentworth, for bringing this Fern into notice. From plants sent by him to Mr. Moore, the Curator of the Chelsea Botanic Gardens, it was described and named by him in the "Gardener's Chronicle and Agricultural Gazette," in 1855, page 708.

The plant has been identified with one of those species collected by the indefatigable traveller, Mr. Fortune, during his journey in China.

A native of China.

An evergreen greenhouse species.

The fronds, which are simple, are narrow, strap-shaped, lanceolate, attenuated both at the base and apex, subcoriaceous in texture, slightly wavy or undulated, and with the margins somewhat recurved, entire or subsinnate on the margin, smooth, punctulate, with small transparent dots.

Length of frond about twelve inches; colour bright green.

The sori round, prominent, uniserial near the costa, and formed on the upper part of the frond.

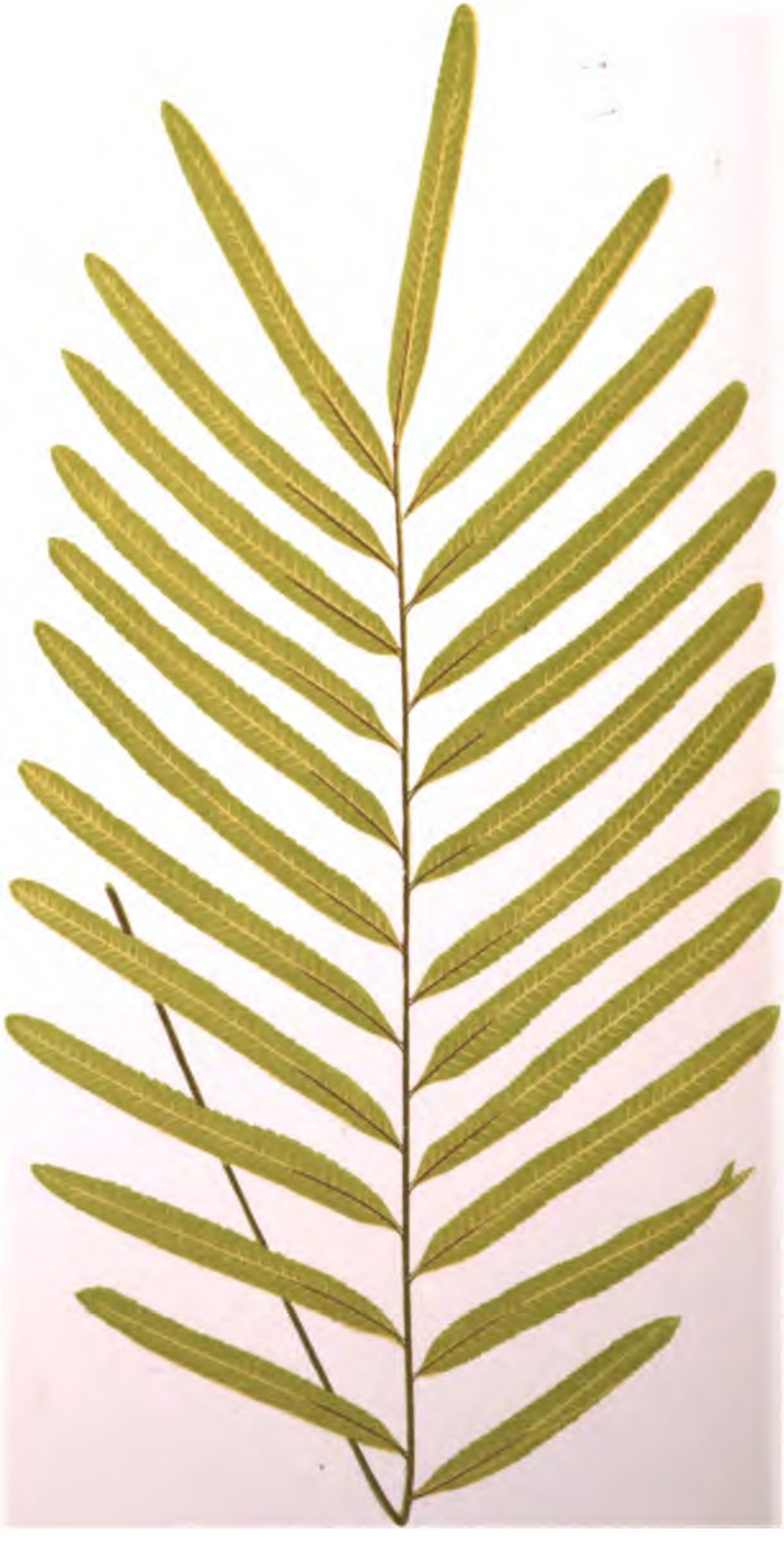
Rhizoma creeping, scaly, and slender, with the fronds lateral and articulated.

The transparent dots in the fronds indicate the thickened apices of the short free veins (veinlets) which branch out from the sides of the series of net-work meshes in which the larger veins are united.

For plants of this species I am indebted to Mr. Sim, of Foot's Cray; and for fronds to Mr. Henderson, of Wentworth.

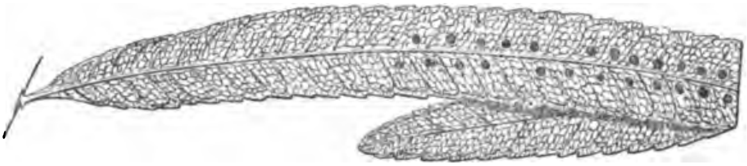
It does not yet appear in any of the Nurserymen's Catalogues, excepting Mr. Sim, of Foot's Cray.

The illustration is from a frond kindly forwarded by Mr. Henderson, of Wentworth.



POLYPODIUM DIVERSIFOLIUM.

XLIII



Portion of mature Frond, under side.

POLYPODIUM DIVERSIFOLIUM.

LOWE.

PLATE XLIII.

Campylonevron angustifolium,	FEE. ?
Drynaria diversifolia,	MOORE.
Polypodium angustifolium,	SWARTZ. RADDI. ?

Polypodium—Polypody. *Diversifolium*—Various leaved.

IN THE SECTION DRYNARIA OF AUTHORS.

The *Polypodium diversifolium,* known best under the name *Drynaria diversifolia,* is a recently introduced and interesting species; its elegant fronds and graceful habit must win it many admirers, and when more generally known in the Nurserymen's Catalogues, will doubtless be extensively cultivated among the amateur Fern growers.

A stove evergreen species.

This Fern, which is a native of the Philippine Islands, of Java, and of New Holland, about Moreton Bay, and within the tropics, is evidently a vigorous grower, reaching three, and probably four feet in height, with lanceolate pinnæ, the lower ones three quarters of an inch in length.

Rhizoma creeping, scaly, stoutish, with lateral-articulated fronds.

Sterile (querciform) fronds, from two to three inches long, cordate-ovate, oblong, deeply pinnatifid, with blunt oblong lobes.

Fronds pinnate, about two feet long, (in our specimens of the cultivated plant,) oblong. Pinnæ alternate, distant, sessile, linear-lanceolate, cuneate at the base, acuminate at the apex, crenato-serrate, articulated with the brownish ternate rachis, the terminal pinnæ similar to the rest, from five to seven inches long, and about three eighths of an inch wide, palish green, the veins prominent beneath.

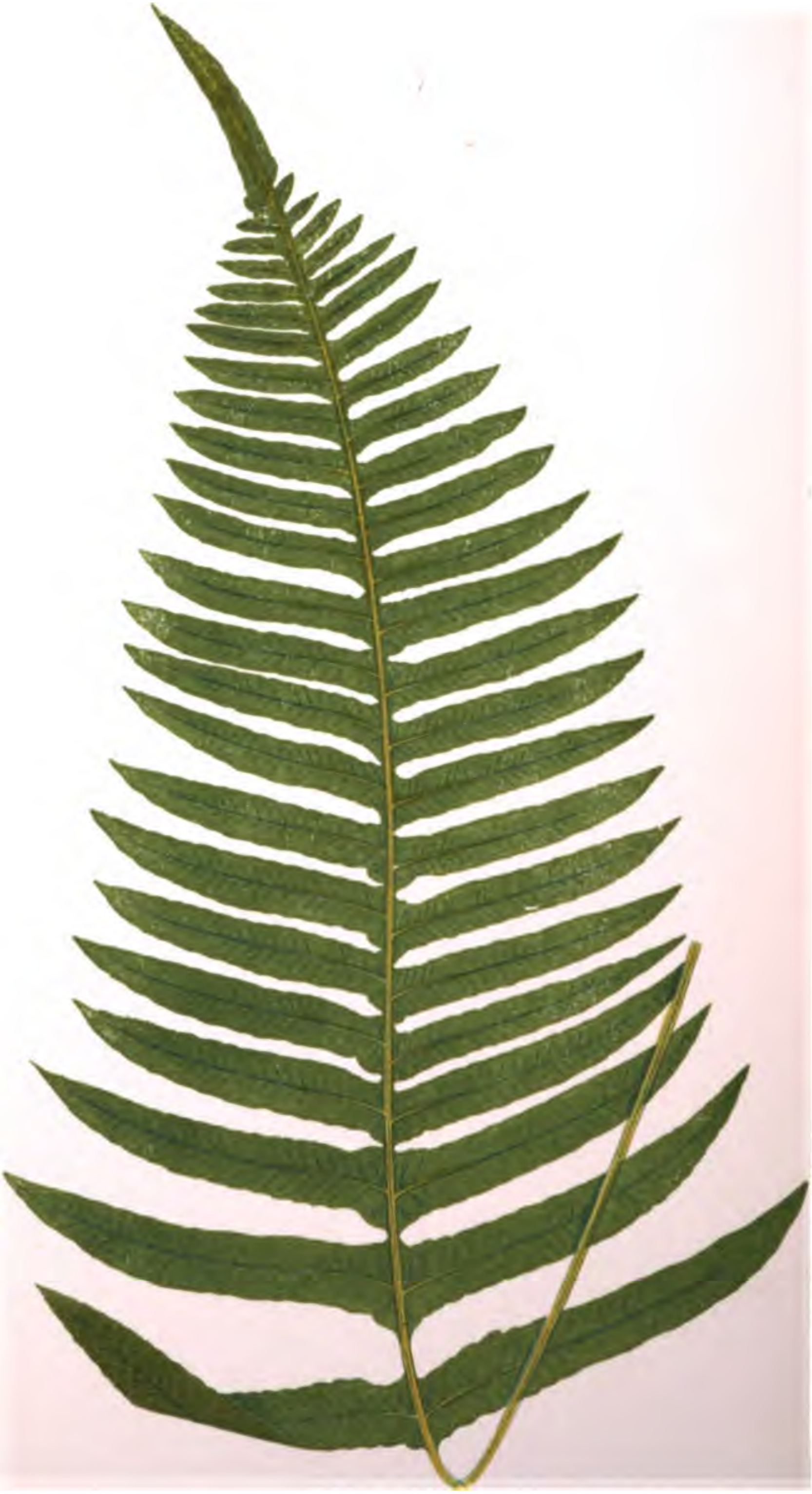
Sori uniserial, on each side the costa, seated in a depression, which forms a wart-like elevation on the upper surface, round, placed singly between the primary veins a short distance from the costa.

The cultivated plants have been obtained from an importation by the Messrs. Rollisson, of Tooting, from Java, about 1850.

My thanks are due to Mr. Sim, of Foot's Cray, and to Mr. Parker, of Holloway, for plants; and to Mr. Henderson, of Wentworth, for barren and fertile fronds.

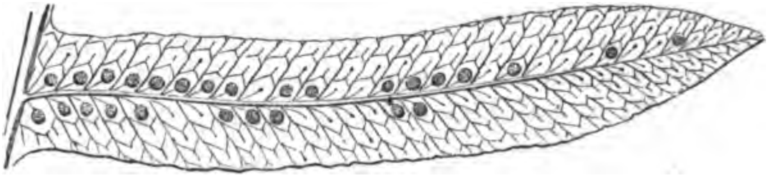
It is in the Catalogues of Messrs. E. G. Henderson, of St. John's Wood; Parker, of Holloway; Booth and Son, of Hamburg; Sim, of Foot's Cray; Rollisson, of Tooting; A. Henderson, of Pine-apple Place; and Veitch, Jun., of Chelsea.

The illustration is from a frond sent by Mr. Henderson, of Wentworth.



POLYPODIUM CATHARINÆ

XLIV



Portion of mature Frond, under side.

POLYPODIUM CATHARINÆ.

Langsdorff and Fischer. Kunze. Sprengel. Kaulfuss.

PLATE XLIV.

Marginaria Catharinæ,	Presl.
Goniophlebium Catharinæ,	J. Smith. Fee.
" "	Moore and Houlston.
Polypodium glaucum,	Raddi.

Polypodium—Polypody. *Catharinæ*—St. Catharine's.

In the Section Goniophlebium of Authors.

This desirable Fern is not so generally cultivated as might have been supposed, when it is considered that it has been in this country during the past fifteen years. It seems to be an easily cultivated species under ordinary Fern management.

It appears to be the *Goniophlebium latipes* of gardens, but not the *G. latipes* of Langsdorff and Fischer, which is a distinct species.

It was first introduced into the Royal Gardens, Kew, in the year 1841, having been received from the Royal Gardens of Berlin.

An evergreen stove Fern.

An inhabitant of Brazil.

The fronds, which are glabrous and broadly lanceolate, stand nearly erect; pinnatifid, the segments being oblong-obtuse.

Length of frond from twelve inches to two feet; colour a dull heavy green.

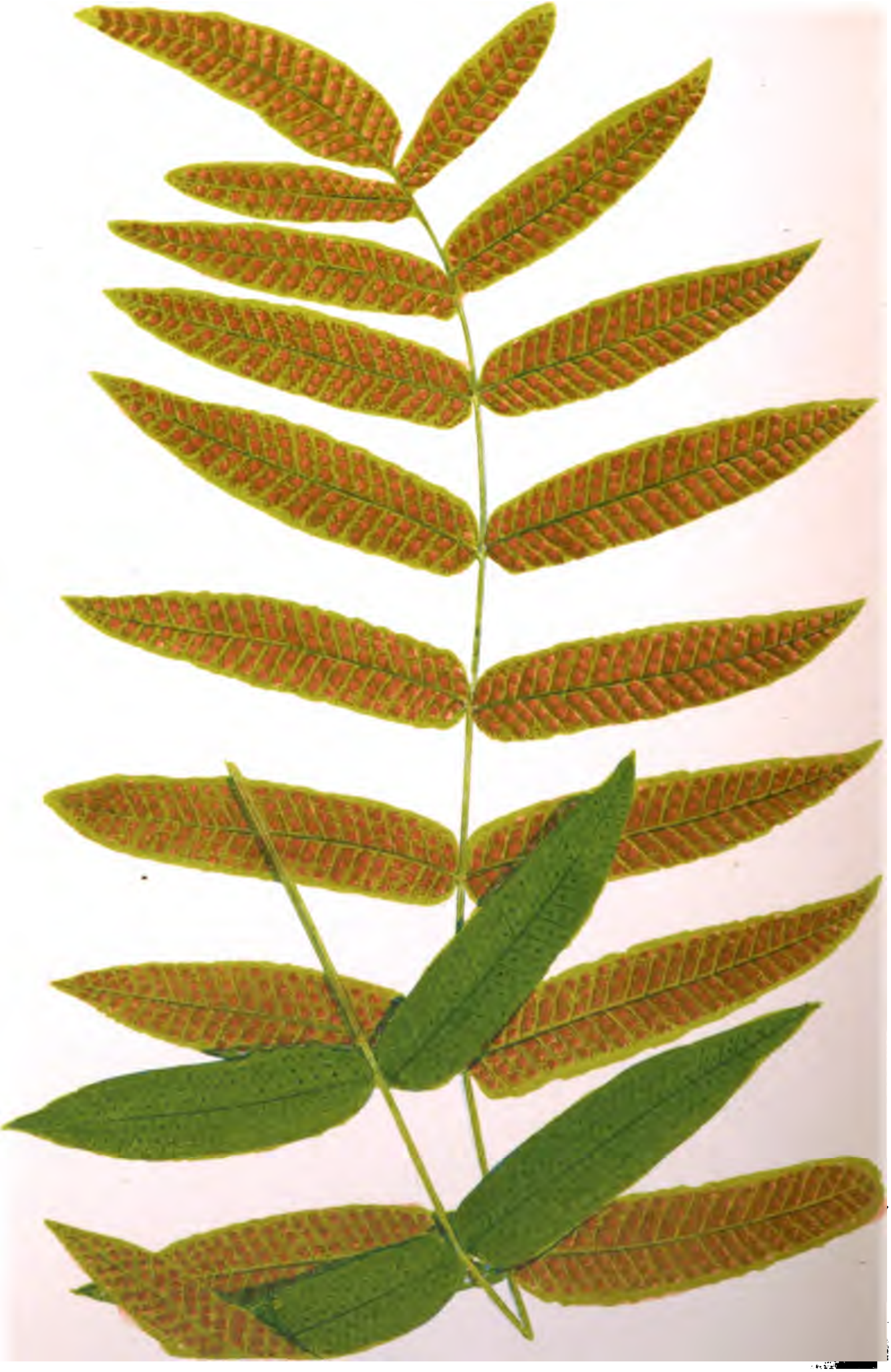
Fronds articulated on a creeping rhizoma, the rhizoma being very thickly covered with imbricated peltate acuminate scales of a brown colour.

Sori biserial and prominent.

I am indebted to Messrs. Rollisson, of Tooting, for a plant of this species; and to Mr. Henderson, of Wentworth, and to Mr. Norman, of Hull, for fronds.

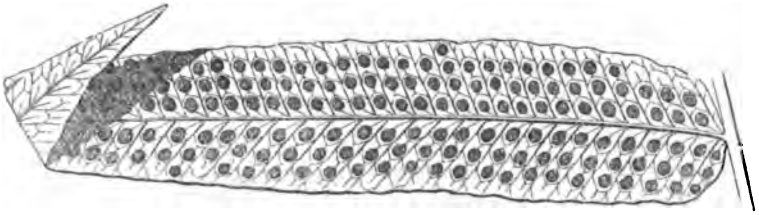
It is in the Catalogues of the following Nurserymen:—Veitch, Jun., of Chelsea; Kennedy, of Covent Garden; A. Henderson, of Pine-apple Place; Parker, of Holloway; Rollisson, of Tooting; and Sim, of Foot's Cray.

The illustration is from a plant in my own collection.



POLYPODIUM PERCUSSUM

XLV



Portion of mature Frond, under side.

POLYPODIUM DEFLEXUM.

KAULFUSS. KUNZE. LINK.

PLATE XLV.

Aspidium deflexum,	
Polypodium distans,	RADDI. FEE.
Goniophlebium deflexum,	MOORE & HOULSTON. J. SMITH.
" "	OF GARDENS.

Polypodium—Polypody.	*Deflexum*—Bent down.

IN THE SECTION GONIOPHLEBIUM OF AUTHORS.

The *Polypodium deflexum* seems to be more generally cultivated than most other species in the section *Goniophlebium*, yet in many instances the true name is unknown. Amongst the names which it has been made to bear, *P. bulbosum* may be mentioned, yet for what reason I am at a loss to say, and indeed where this name has been first found appears quite as difficult to determine. It is a Fern easily grown, and one which flourishes under ordinary management.

A Brazilian Fern.

Introduced into England in the year 1830.

An evergreen stove species.

P. deflexum is graceful, and well deserving to be generally cultivated.

The fronds, which are glabrous, are pinnate, the pinnæ being lanceolate-acuminate in form, deflexed, coriaceous, and undulated. They are rounded at the base, and articulated with the rachis; the lower ones frequently divided.

The frond, which varies from one to two feet in length, is of a heavy dull green colour.

Stipes and rachis very dark green. Lateral, articulated on a creeping rhizoma, which is covered with brown scales.

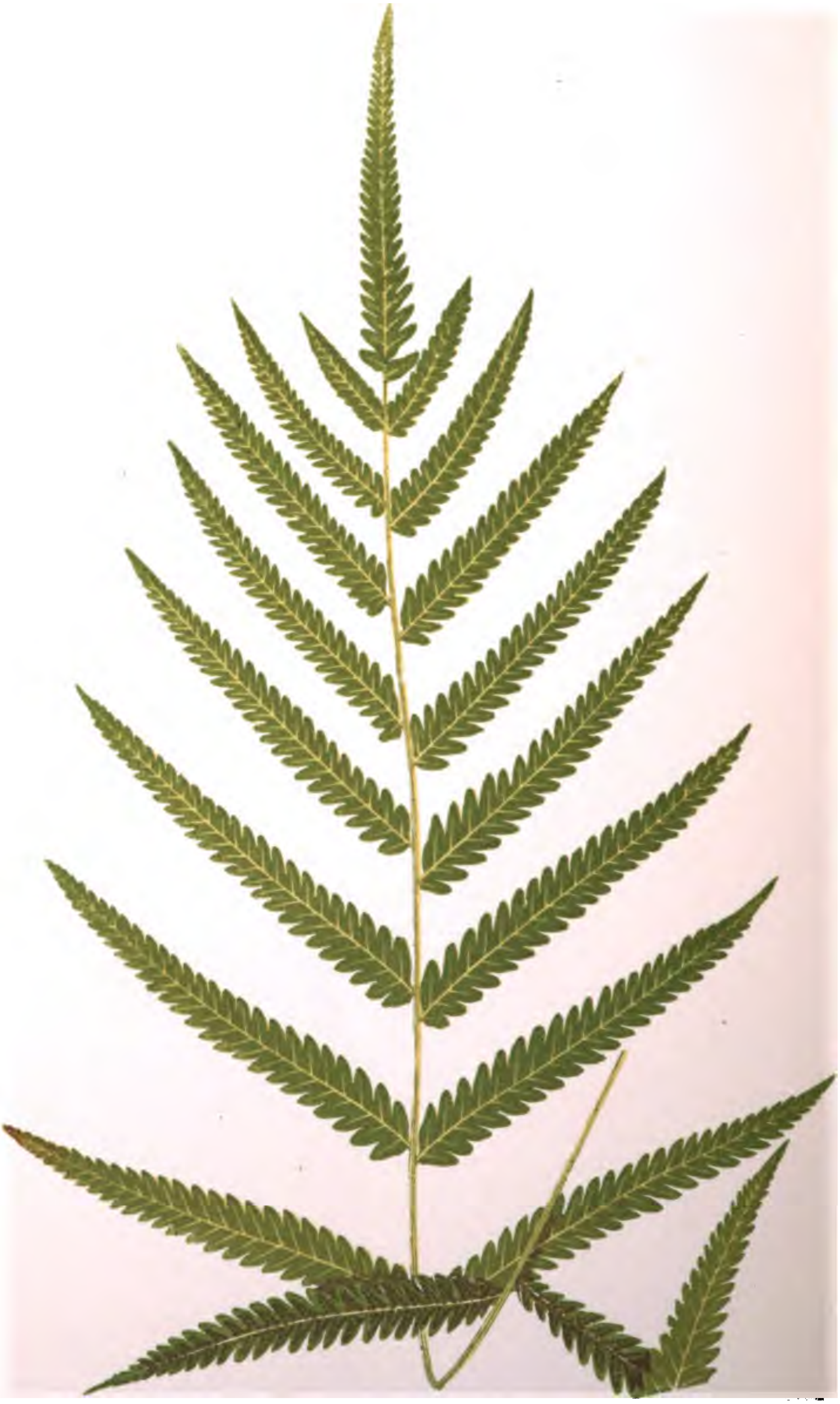
Sori biserial and prominent.

My thanks are due to Sir Oswald Mosley, Bart., of Rolleston Hall, near Burton-on-Trent, for plants of the present species, and to Mr. Henderson, of Wentworth, and to Mr. Norman, of Hull, for fronds.

It does not appear to be a common Nurseryman's plant, it may however be procured of Messrs. Rollisson, of Tooting, near London.

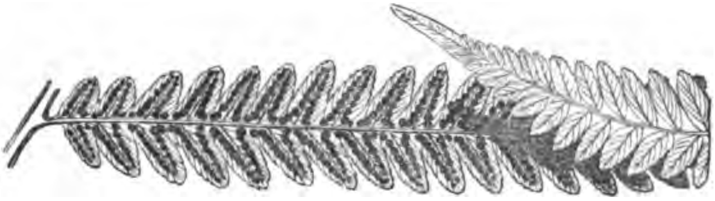
More generally known as the *Goniophlebium deflexum*.

The illustration is from a plant in my own possession.



POLYPODIUM TETRAGONUM

XLVI



Portion of mature Frond.

POLYPODIUM TETRAGONUM.

SWARTZ. KUNZE. LINNÆUS. SCHKUHR.

PLATE XLVI.

Aspidium cicutarium,	OF GARDENS.
Polypodium subtetragonum,	LINK.
" *Smithianum,*	HEWARD.
Goniopteris tetragona,	PRESL. FEE.
" *subtetragonum,*	PRESL. FEE.

Polypodium—Polypody. *Tetragonum*—Four-angled.

IN THE SECTION GONIOPTERIS OF AUTHORS.

A HANDSOME Fern, seldom to be found in any excepting the best collections.

Introduced into the Royal Gardens, Kew, from the Royal Gardens of Berlin, in the year 1841.

An evergreen stove species.

A native of South America, and the West Indies.

Best known as the *Goniopteris tetragona.*

Caudex short, creeping, with terminal adherent fronds.

Fronds of two kinds, the barren shorter, more spreading, with broader pinnæ and pinnules, the fertile more erect, taller, and somewhat contracted. Sterile fronds ovate, often broad at the base, from one to two feet high; pinnato-pinnatifid, the lower pinnæ deflexed, the fronds abrupt at the top, with a pinnatifid lanceolate tail-like terminal pinna. Pinnæ lanceolate, the lower ones tapering towards the base, sessile, acuminate-pinnatifid, the segments blunt, oblong, and somewhat falcated. Fertile fronds nearly ovate, with narrower more distant pinnæ, the lower of which are narrowed towards the base; fertile throughout. The upper pinnæ are broad and abrupt, and not narrowed at the base.

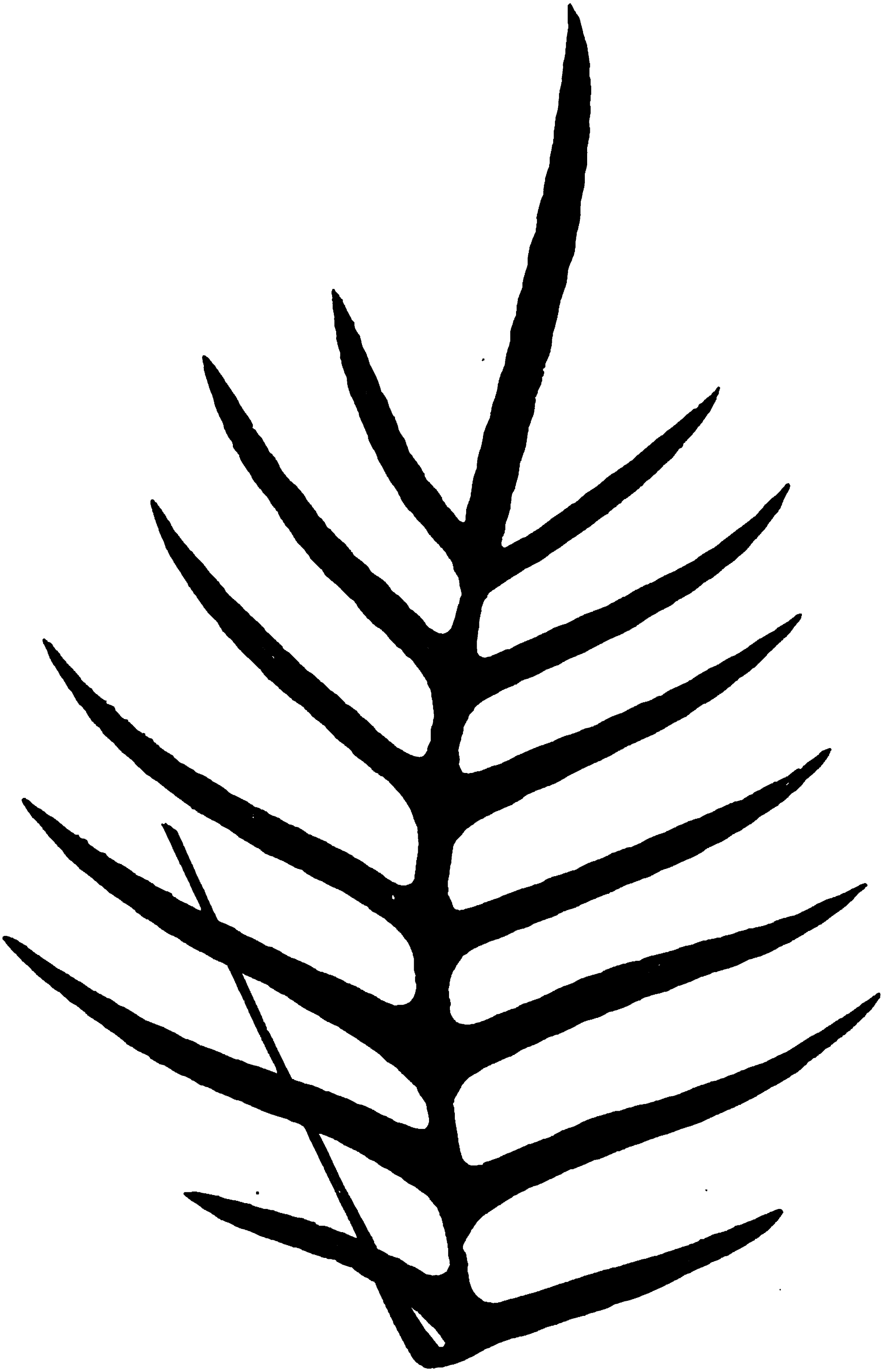
Sori abundant, round, becoming effuse and confluent in lines, forming a double series up the centre of the lobes, from the main costa to the apex of the lobe, the lobes somewhat wider apart at the base.

A handsome Fern, with bright green shining fronds, having a distinct aspect from the presence of the broader barren, and narrower fertile fronds, and also remarkable for the tapering towards the base of the lower pinnæ.

My thanks are due to Mr. Henderson, of Wentworth, for a plant and fronds of this species.

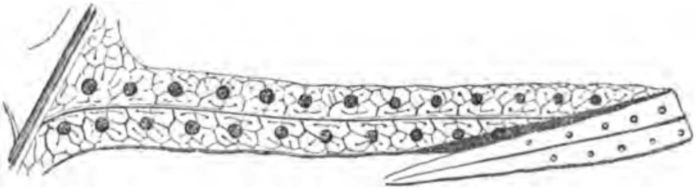
It may be procured of Mr. A. Henderson, of the Pine-apple Place Nursery, London. I am not aware of any other Catalogue which contains it.

The illustration is from a frond sent by Mr. Henderson, of Wentworth.



POLYPODIUM BILLARDIERI.

XLVII



Portion of mature Frond, under side.

POLYPODIUM BILLARDIERI.

R. Brown. Kunze.

PLATE XLVII.

Polypodium scandens,		Labillardiere.
Chrysopteris Billardieri,		Link.
Drynaria	"	J. Smith. Fee.
"	"	Moore and Houlston.
Phymatodes	"	Presl.

Polypodium—Polypody. *Billardieri*—Named after Billardiere.

In the Section Drynaria of Authors.

As Mr. Smith very justly remarks, the distinctive difference between this Fern and the *Polypodium phymatodes* is more readily seen in the growing plant, than it is describable. It is a handsome Fern when well managed. There is a magnificent plant in the collection at Wentworth.

Introduced into the Royal Gardens, Kew, in the year 1824, by Allan Cunningham.

An evergreen greenhouse Fern.

Native of Australia, New Holland, New Zealand, and Van Diemen's Land.

This species flourishes best in a shallow flower-pan, with plentiful drainage; indeed drainage is the great essential with

Ferns, for although they delight in abundance of moisture, but few species can endure water lingering about their roots.

Best known as the *Drynaria Billardieri* in English gardens.

The fronds, which are glabrous, stand erect. There are some simple, in others pinnatifid fronds; in young or freshly-divided plants the simple fronds predominate, whilst in an old-established one they are nearly all pinnatifid. A few linear acuminated segments; coriaceous; and attenuated at the base. Solitary scattered scales on stipes and rachis.

The fronds, which are lateral, are articulated on a cœspitose rhizoma, which is creeping, and covered with dark brown scales.

The sori circular, of large size, uniserial, and immersed in the frond, so as to form protuberances on the upper side.

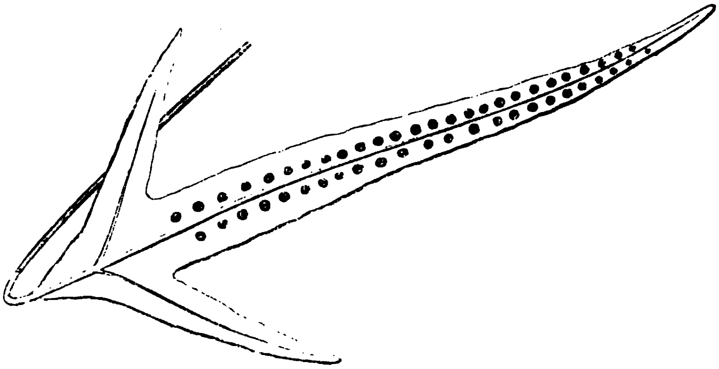
The apex of each of the branches of the veinlets is swollen and snowy white, giving the upper side of the frond a spotted appearance.

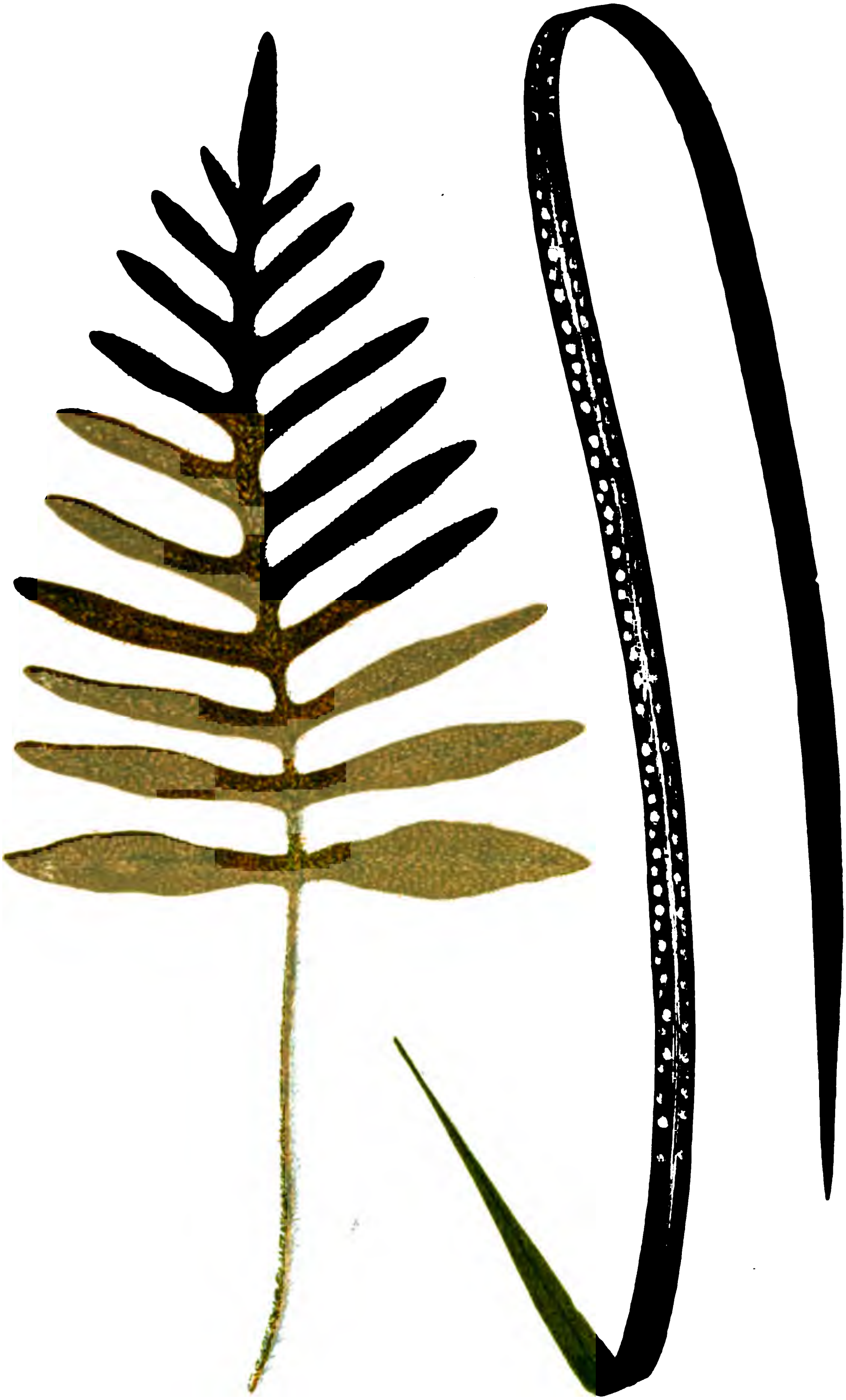
Colour deep green, usually the frond is about twelve inches in height.

For plants and fronds my obligations are due to Mr. Henderson, of Wentworth.

It is in the Fern Catalogues of Messrs. A. Henderson, of Pine-apple Place; E. G. Henderson, of St. John's Wood; Rollisson, of Tooting; Sim, of Foot's Cray; Veitch, Jun., of Chelsea; Parker, of Holloway; and Kennedy, of Covent Garden.

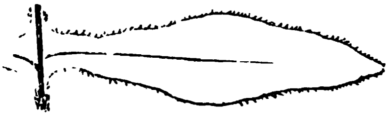
The illustration is from a plant in the Wentworth collection.





POLYPODIUM [illegible].   P. ANGUSTIFOLIUM.

XLVIII



Portion of mature Frond, upper side.

POLYPODIUM INCANUM.

Kunze. Swartz. Sprengel. Willdenow.
Humboldt and Bonpland. Pursh. Nuttall. Meyer.
Kaulfuss. Fee. Morison. Schkuhr. Plukenet.

PLATE XLVIII.—A.

Polypodium albidum,	Presl.
“ *ceteraccinum,*	Michaux.
“ *velatum,*	Schkuhr.
Goniophlebium incanum,	J. Smith. Moore & Houlston.
Marginaria incana,	Presl.
“ *ceteracina,*	Bory.
“ *minima,*	Bory.
Acrostichum ferruginosum,	Linnæus. Lamarck.
“ *polypodioides,*	Linnæus. Lamarck.
Pleopeltis pinnatifida,	Of English Gardens.

Polypodium—Polypody. *Incanum*—Hoary.

In the Section Goniophlebium of Authors.

An interesting and curious Fern, very distinct, of dwarf habit, and well worthy of extended cultivation.

Introduced into the Royal Gardens, Kew, in 1841, by Messrs. Loddiges, of Hackney.

It appears to be cultivated in England more frequently under the name of *Pleopeltis pinnatifida*. A plant received from Messrs.

A. Henderson under this name, is the *Polypodium incanum* of Kunze.

A stove evergreen Fern.

Native of the West Indies and South America, Brazil, Jamaica, St. Catharine's Island, etc.

Perhaps better known in this country under the name of *Goniophlebium incanum.*

The fronds, which are pinnatifid, are lanceolate in form. Segments oblong-obtuse and coriaceous.

Fronds lateral, being articulated on a rhizoma which is creeping and covered with scales. The veins are external and almost invisible.

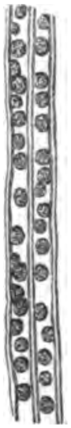
The sori, which are uniserial, are submarginal and immersed.

Length of frond varying from five to twelve inches; colour above a dull green, below brownish, owing to the dense covering of roundish, fimbriate peltate scales, which are pale in colour in a young frond, becoming brown in the more mature state.

My thanks are due to Messrs. Rollisson, of Tooting, and to Messrs. A. Henderson, of Pine-apple Place, for plants of *Polypodium incanum.*

It may be procured of Messrs. Rollisson or A. Henderson.

The illustration is from a plant in my own collection.



Portion of mature Frond, under side.

POLYPODIUM ANGUSTIFOLIUM.

Kunze. J. Smith. Raddi. Swartz.

PLATE XLVIII.—B.

Campyloneuron angustifolium,	Fee.
Campyloneurum angustifolium,	Swartz.
Cyrtophlebium angustifolium,	J. Smith.
" "	Moore and Houlston.
Marginaria dimorpha,	Link.

Polypodium—Polypody. *Angustifolium*—Narrow-leaved.

In the Section Cyrtophlebium of Authors.

A singular, distinct species, requiring more management than most other Ferns, yet well worthy of the trouble bestowed upon it.

An evergreen stove Fern.

A native of the West Indies and South America, Brazil, Jamaica, and Mexico.

Introduced into the Royal Gardens, Kew, in 1841, from the Royal Botanic Gardens of Berlin.

Fronds glabrous, simple, acuminate, very narrow, coriaceous, having a somewhat revolute margin. Decurrent at the base. The fronds lateral, being articulated on a scaly rhizoma, which is short and creeping.

Veins immersed, the frond having a fleshy appearance.

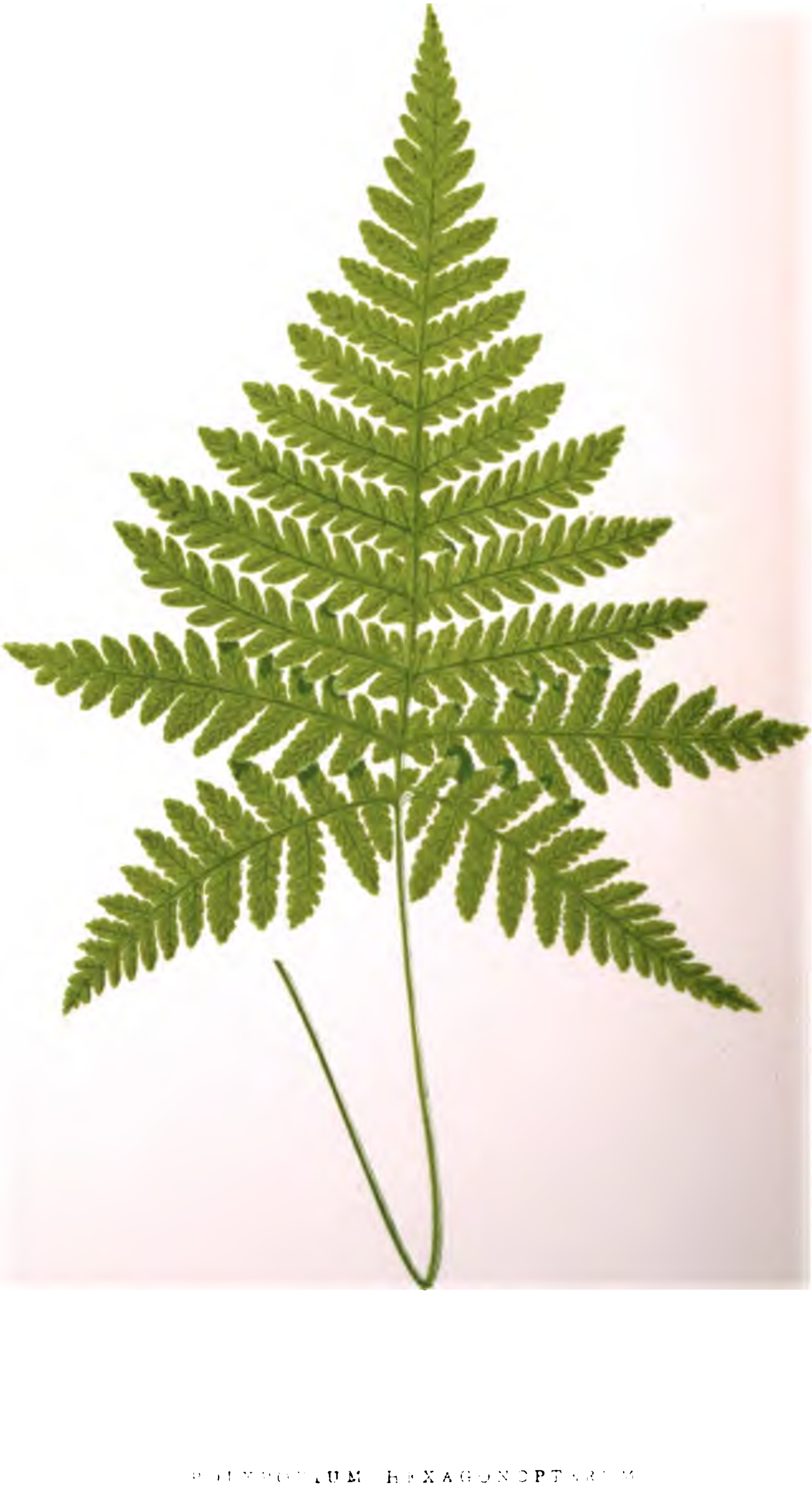
Sori medial.

Length of frond from twelve to eighteen inches; colour a dull green; and width of frond equal for half its length, becoming narrow both at the base and apex.

Best known as the *Cyrtophlebium angustifolium.*

My obligations are due to Sir Oswald Mosley, of Rolleston Hall; Mr. Masters, of the Exotic Nursery, Canterbury; and to Messrs. A. Henderson, of Pine-apple Place, for plants; and to Mr. J. Henderson, of Wentworth, and Mr. Sim, of Foot's Cray, for fronds.

The illustration is from a plant in the Wentworth collection.



POLYPODIUM HEXAGONOPTERUM

XLIX

Portion of mature Frond, under side.

POLYPODIUM HEXAGONOPTERUM.

MICHAUX. MOORE AND HOULSTON. KUNZE. WILLDENOW.
LINK. SWARTZ. HOOKER AND GREVILLE. PRESL.

PLATE XLIX.

Polypodium cruciatum,	KAULFUSS.
Phegopteris hexagonoptera,	FEE.

Polypodium—Polypody. *Hexagonopterum*—Six-angled-winged.

THE *Polypodium hexagonopterum* must be considered as one of the rare cultivated species. In appearance it somewhat resembles our British *P. Robertianum* and *P. dryopteris.* It is a desirable species, from its being a hardy Fern, and no collection should be without it; although even some of our larger collections have it amongst their desiderata.

A handsome, deciduous, hardy Fern.

A native of North America.

Introduced into England about the year 1811.

The fronds are of a triangular form, bipinnatifid, pinnæ opposite, sessile, decurrent at the base, the segments crenulate, oblong-obtuse. Fronds lateral, hairy, adherent to a creeping rhizoma.

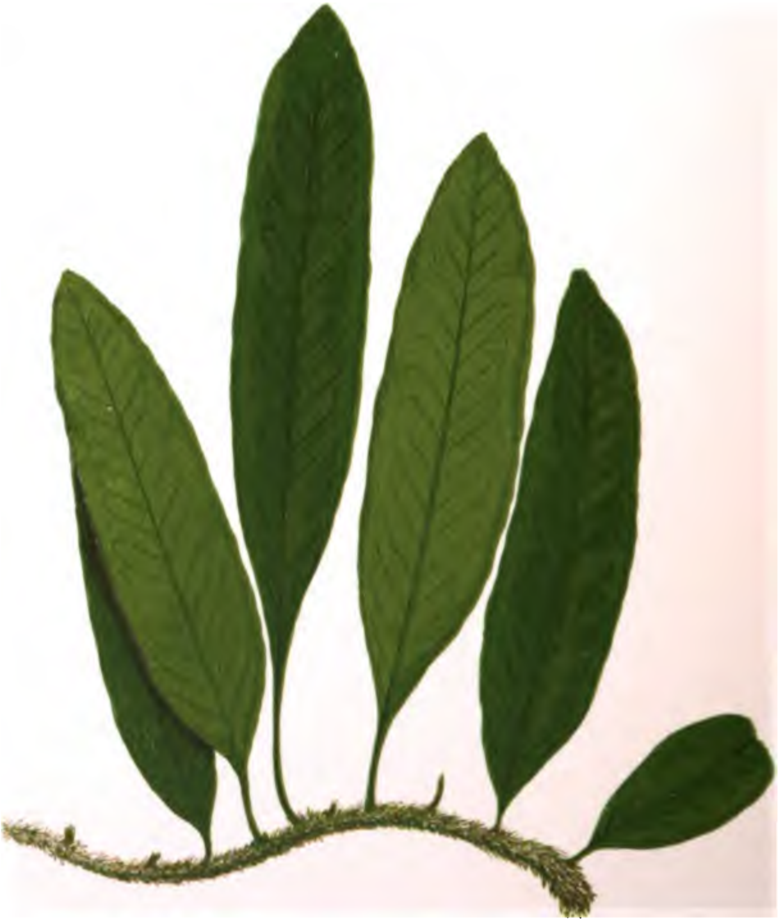
Length of frond from twelve to eighteen inches; colour dark green.

Sori submarginal.

Messrs. Booth, of Hamburg, have forwarded me plants and fronds of this species.

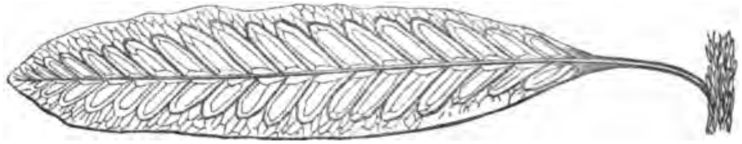
The only Catalogues which contain this Fern are those of Messrs. Booth, of Hamburg, and Kennedy, of Covent Garden.

The illustration is from a plant in my own collection.



POLYPODIUM SQUAMULOSUM.

L



Portion of mature Frond, upper side.

POLYPODIUM SQUAMULOSUM.

KUNZE. KAULFUSS.

PLATE L.

Polypodium squamulosa,	Presl.
Phlebodium squamulosum,	J. Smith.
" "	Moore and Houlston.
" *myrtillifolium,*	Of Gardens.

Polypodium—Polypody. *Squamulosum*—Scaly.

An interesting dwarf creeping Fern, very suitable for growing in a suspended basket. I believe that it has never fructified in England.

It is a species easily grown, and from its rapid growth soon forms a handsome plant.

It was introduced into the Royal Gardens, Kew, in the year 1843, having been sent by the late J. Riley, Esq., of Papplewick, near Nottingham, a gentleman, who, in his day, had a very fine collection of Ferns. At Mr. Riley's death, the collection passed into the hands of Dr. Forbes Young, who grows Ferns successfully.

An evergreen stove Fern.

A native of Brazil and St. Catharine's Island.

Best known as the *Phlebodium squamulosum.*

I know nothing of the fertile fronds; the sterile ones are simple, erect in growth, and oblong-elliptical in form, coriaceous, attenuated at the base, and being articulated on a densely scaly rhizoma, the scales wrapping over each other. In the young state they are nearly white, becoming pale brown when more mature. The rhizoma is branched and creeping.

Length of frond from two to three inches; colour a dull heavy green.

The frond is prettily veined, like *Polypodium venosum*, but being less transparent the veins are not so plainly visible.

My thanks are due to Mr. Henderson, of Wentworth, for a nice plant of *P. squamulosum*.

It is in the Fern Catalogues of R. Parker, of Holloway; Booth and Son, of Hamburg; and Kennedy, of Covent Garden.

The illustration is from a plant in my own collection.

END OF VOL. I.

B. FAWCETT, ENGRAVER AND PRINTER, DRIFFIELD.

GLOSSARY FOR VOL. I.

Acuminate. Terminating in a long taper point.

Adnate. Growing to, or attached throughout the whole length.

Alternate. When the pinnæ are not opposite each other, they are said to be alternate.

Amorphous. When a part or the whole of the disc of the frond is altered in texture, and closely occupied by the sporangia. When the form is indistinct.

Anastomosing. When all the apices of the veins are joined together with another vein; or the veins reunite, they are said to anastomose.

Apex. The extreme end.

Apices. The plural of apex.

Appressed. Pressed together. Where a part lies close to another throughout its whole length.

Approximate. Near to, but not united.

Articulated. Jointed.

Attenuated. Becoming narrower towards either extremity.

Auriculate. Eared.

Axil. The upper angle formed by the attachment of a leaf or branch to its support.

Axillary. If the receptacle is on the point of the forking of the venules, it is axillary.

Barren. Fronds without fructification.

Bifid. Divided into two.

Binate. Where a leaf is composed of two leaflets placed at the end of a common petiole, or where a simple leaf is nearly divided into two equal parts.

Bipartite. Deeply divided into two parts.

Bipinnate. Twice-divided leaves. Where the leaflets on the secondary petioles of a doubly compound leaf are arranged in a pinnate manner, the secondary petioles themselves being similarly placed on the primary.

Biserial. In two rows.

Bisubtripinnate. Nearly twice tripinnate.

Bitripinnate. Twice tripinnate. See *Tripinnate.*

Bitripinnatifid. Twice tripinnatifid. See *Tripinnatifid.*

Bulbilles. The young plants growing on the parent frond.

Calyciform. When the indusium is attached all round the margin of the receptacle.

Capsules. Cells for the reception of seeds. The Theca Ferns.

Caudate. Tailed, or tail-pointed.

Caudex. A stem or main-trunk.

Caudiciform. Form of a tail.

Central. When the indusium is produced from the centre of the receptacle.

Circinate. When the young fronds unfold in a scroll-like form; being rolled inwards from the summit towards the base.

Cæspitose. Densely crowded in turf-like patches.

Compital. Cross-way, where several ways meet. If the receptacle is on the angular crossings or points of confluence of two or more venules.

Confluent. When the seed vessels spread so as to join and make a connected mass, spread more or less over the frond.

Contiguous. Meeting or touching one another, when two parts are in contact through their whole length.

Cordate-hastate. Shaped like a heart below, the apex being arrow-headed.

Cordate-ovate. An oval-heart shape, broad at the base.

Coriaceous. When of a leathery consistency.

Costa. The midrib of the frond.

Costal. Belonging to the ribs; when seed vessels are situated near the midrib, they are costal.

Crenate. When the frond is toothed on the edge, in regular rounded teeth.

Crenato-serrate. A combination of crenate and serrate.

Crenulate. Crenate.

Cuneate. Wedge-shaped.

Deciduous. Ferns are deciduous that are without leaves in the winter.

Decompound. Thrice pinnate.

Decurrent. When the leaf portion extends down the stem, and gradually merges into it.

Deflexed. Bending gradually downwards through the whole length.

Dentate. Toothed; when the end of the frond is jagged.

Devoid of Pinnæ. Without pinnæ.

Dichotomous. Where any part subdivides into two branches, and each of these again into two others.

Dilatate. Extended, spread out.

Dimidiate. Fully developed on one side of the midrib, and scarcely at all on the other.

Dimidiato-cuneate. Divided into two wedge-shaped parts.

Ebeneous. Like ebony.

Elongate. Drawn out, lengthened, long in comparison with its breadth.

Elongate-acuminate. Long, and drawn out to a point.

Emarginate. Slightly notched at the summit, as if a piece were cut out.

Ensiform. Sword-shaped.

Entire-frond. Consisting of one piece; not divided.

Falcated. Hooked; plane and curved, with the edges parallel.

Farina. Mealy; a powder found on some species of Ferns.

Fasciculate. Where several similar parts originate at the same spot, and are collected close together.

Ferruginous. Colour of rusty iron.

Fertile. A fruitful frond.

Filiform. Cylindrical and slender, like a thread.

Flabellate. Fan-shaped; rounded at the apex, and wedge-shaped at the base.

Flexuous-veins. Winding tortuous veins, bending to and fro in opposite directions.

Frond. The leaf of a Fern.

Fructification. The reproductive organs.

Fusco-pubescent. Reddish green hairs or scales.

Glabrous. Smooth, without hairs.

Glandulose. Having glands.

Imbricate. Covered with scales, overlapping each other like the tiles of a house.

Inciso-serrate. When the edges are sharply cut in teeth-like form.

Indusium. A thin skin which covers the sporangia or seed vessels of some Ferns.

Intramarginal. When seed vessels are situated between margin and midrib, it is said to be intramarginal.

Laciniated. Fringed.

Lanceolate. When the veins extend from end to end, and are rather more distant in the middle of the leaf.

Lanceolate-acuminate. Narrow, and tapering at each end.

Lateral. When indusium is produced on one side of the receptacle.

Lateral-frond. Fixed on one side.

Linear-filiform. Cylindrical, and with margins parallel, the length being great in comparison with the breadth.

Linear leaf. When the divergent veins are but slightly distant, and extend from the base to the apex, inclosing only a narrow slip of parenchyma; when both sides are parallel, the leaves of grasses are examples.

Lobed. Separated into lobes.

Lunate. Crescent-shaped.

Marchantiaform. Resembling Marchantia or Liverwort, which seedling Ferns do very nearly.

Marginal. When seed vessels are on or close to the margin of a frond, they are marginal.

Medial. If the receptacle is somewhere between the apex and the base of the venules.

Membranaceous.
Membranous. } Consisting of membranes—thin covering.

Midrib. The centre vein, the costa.

Multiserial. In many rows.

Oblique. When the seed vessels, when elongated, are at an angle with the midrib.

Oblong-linear. A lengthened elliptical form.

Obovate. Wider at the apex than base—egg-shaped.

Ovate. When the development is greater at the base than at the apex —egg-shaped.

Ovate-rhomboidal. Rhomboidal egg-shaped.

Pedate. Palmate, with the addition of further subdivisions in the lateral portions.

Pedicellate. Having a pedicel.

Pedicels. Stalks.

Pentangular. Deltoid.

Petiolate. Furnished with a petiole.

Petiole. Foot-stalk of a frond or leaf—leaf-stalk.

Pinnæ. Single leaflets in pinnate fronds.

Pinnæ alternate. When the pinnæ are not arranged opposite each other.

Pinnate. Separate leaves arranged along each side of the midrib, and divided quite to the rachis.

Pinnatifid. When the edge of the frond is cut in deep segments, nearly, yet not quite down to the rachis.

Pinnato-pinnatifid. The compound of pinnate and pinnatifid.

Pinnules. The leaf-like divisions of the pinnæ; a leaflet of a compound frond.

Posterior side. That side which is behind.

Pubescent. Hairy.

Querciform. Oak-leaf form.

Rachis. The stalk of a frond; that portion where the leaves or pinnæ are situated.

Radicles. The descending roots. The small roots or fibres.

Receptacle. The organ of fructification. That spot amongst the veins where the capsules are placed. Genera and species are determined by its position with regard to the veins.

Reflexed. Turned back, so as to approach the base.

Reniform. Kidney-shaped.

Replicate. Doubled down so that the upper part comes in contact with the lower.

Revolute. Turned backwards from the extremity upon the under side.

Revolute margin. The margin turned back.

Rhizoma. The root stem. The stem from which the roots descend, and the fronds rise.

Rhomboidal. Somewhat of the form of a rhomboid.

Rugose. Rough or wrinkled.

Scaly. Furnished with scales.

Segments. The subdivisions of any parts or organs.

Serrate. Notched like a saw on the edges.

Serrulate. Notched like a small saw on the edges.

Sessile. When without a petiole or leaf-stalk.

Simple frond. An entire undivided frond.

Simple veins. Single veins without branches.

Sinuses. The depression between two projections.

Sori. Little clusters of capsules, which are a mass of cellular substance without cotyledons, and germinate indifferently from any part of their substance.

Sori effuse. When sori spread out.

Sphagnum. A water moss.

Sporangia. The seed vessels containing the sporules. Seed cases.

Sporangiferous. Sporangia.

Sporules. A number of contained cells in the sori from which new plants are produced.

Stellate pubescence. Star-like hairs or scales, disposed in a radiating manner round a centre.

Sterile frond. Barren frond.

Stipes. The foot-stalk of the frond, that portion below the pinnæ or leaves.

Subauriculate. Nearly eared.

Subbipinnate. Nearly twice pinnate.

Subcrenate. Slightly jagged.

Subimbricate. Nearly imbricate.

Subsessile. Almost without a leaf-stalk.

Subterminal. Near the extremity.

Terminal. When the sporangiferous receptacle is formed on the apex of the venules, it is said to be terminal.

Ternate. Arranged by threes.

Ternate rachis. Ternate stalk.

Transverse. When seed vessels run parallel with the midrib, or margin of the frond.

Tripinnate. Thrice pinnate.

Triquadripinnate. Three times quadripinnate.

Truncate. Terminating abruptly.

Unilateral. On one side.

Unilocular. With only one cell.

Uniserial. A single row.

Venation. The arrangement of veins.

Venation circinate. When the veins are rolled inwards from the summit towards the base.

Venule. A veinlet.

Viviparous. Having the property of reproducing plants on the fronds independent of the seed vessels.

INDEX TO VOL. I.

[Those Ferns having an authority attached, are the respective names adopted in this Work, of which a description, together with Coloured Illustration, and one or more woodcuts, is given.]

PAGE.
Acrostichum aculeatum . . . 3
  albidulum 33
  album 5
  calomelanos 5
  canariense 51
  catanense 43
  chrysophyllum . . . 3
  ebenum 5
  ferruginosum . . . 139
  lanuginosum . . . 43
  lepidopteris . . . 101
  leptophyllum . . . 17
  lingua 67
  marantæ 51
  maranthæ . . . 43
  polypodioides . . . 139
  pteroides . . . 37
  sinuatum 37
  subcordatum . . . 51
  sulphureum 11
  tartareum 7
  velleum 43
Adiantum effusum . . 73
  vestitum 45
Aleuritopteris argentea . . 55
Allosorus argentea 55
Anogramma chærophylla . . 21
  leptophylla 17

PAGE.
Anogramme chærophylla . . 21
  leptophylla 17
  villosa 27
Aspidium alpestre 115
  cicutarium . . . 135
  deflexum 133
  distantifolium . . . 115
  lanosum 45
  rhæticum 115
  thelypteris 91
Asplenium filix-fœmina 115, 116, 117
  tomentosum . . 13, 15
Athyrium alpestre 115
Campyloneurum angustifolium 141
  phillytidis 79
  phyllitidis 79
Campylonevron angustifolium 129
  " " . 141
  phillitidis 79
Cassebeera argentea . . 55
  farinosa . . . 55, 56
Ceropteris calomelæna . . 5
  chrysophylla . . 3, 25
  l' herminieri . . 23
  martensii 25
  massoni 9
  sulphurea 11
  tartarea 7

PAGE.
Ceterach lobatum 15
marantæ 51
officinarum . . . 52
Cheilanthes argentea . . . 55
ferruginea . . . 53
lanuginosa . . . 45
squamosa . . . 49
tomentosa . . . 41
vestita 45
Chrysopteris billardieri . 137
longipes . . . 75
phymatodes . . . 77
Cincinalis marantæ . . . 51
nivea 33
subcordata . . . 51
tenera 39
trichomanoides . . 37
vellea 43
Craspedaria chinensis . . 67
ciliatum 97
lagopodioides . . 121
pertusa 65
piloselloides . . . 97
rupestris 63
vaccinifolia . . . 121
Ctenopteris vulgaris . . 111
Cyathea vestita . . . 101
Cyrtophlebium angustifolium 141
" " 142
phyllitidis . . 79, 80
Dicksonia antarctica . . v
Drynaria billardieri . 137, 138
diversifolia . . 93, 129
fortuni . . . 127
irioides . . 125, 126
irregulare . . . 125
longipes . . 75, 76
phymatodes . . 77
vulgaris . . . 77, 78
Goniophlebium albo-punctatum 107
" " 108
argutum . . 119, 120
catharinæ . . . 131
deflexum . . 133, 134
grandidens . . 119
incanum . . 139, 140

PAGE.
Goniophlebium latipes . 131
piloselloides . . 97, 98
reinwardti . . 109
sepultum . . . 101
subauriculatum . . 109
" . . 110
vaccinifolium . . 121
" . . 122
Goniopteris asplenioides 103, 104
crenata . . 81, 82
fraxinifolia . . . 95, 96
subtetragonum . . 135
tetragona . . . 135
Grammitis leptophylla . . 17
scandicina . . . 19
villosa 27
Gymnocarpium dryopteris . . 83
phegopteris . . . 91
robertianum . . . 87
Gymnogramma calomelanos. *Kaulfuss* . 5, 6, 7, 8, 9, 10, 26
Gymnogramma chærophylla. *Desvaux* . . 18, 19, 21, 22
Gymnogramma chærophyllum 21
chrysophylla. *Kaulfuss* 3, 4, 5, 6, 9, 10, 11, 23, 24, 25, 26
Gymnogramma dealbata . 7
hybrida 25
leptophylla. *Desvaux* 2, 17, 18, 19, 21
Gymnogromma l' herminieri. *Bory* 23, 24
Gymnogramma loweii . . 29
martensii. *Bory* . 25, 26
massoni 9
minor 21
ochracea. *Presl* . 9, 10
peruviana . . . 6
rufa. *Desvaux* . 13, 14
sulphurea. *Desvaux* 11, 12, 23
tartarea. *Desvaux* 7, 8, 9, 10
tartareum . . . 7
tomentosa. *Desvaux* 13, 15
totta. *Schlechtendal* . 29
villosa. *Link* . . 27. 28

PAGE.

- Gymnogramme acuminata . 13
  - calomelanos . . 5
  - chærophylla . . . 19
  - chrysophylla . . 3
  - leptophylla . . . 17
  - l'herminieri . . 23
  - martensii . . . 25
  - ochracea . . . 9
  - rufa 13
  - sulphurea . . . 11
  - tartarea . . . 7
  - tomentosa . . . 15
  - totta 29
  - villosa . . . 27
- Hemionitis acuminata . . 13
  - brasiliensis . . 15
  - chærophylla . . . 21
  - dealbata . . . 7
  - leptophylla . . . 17
  - tomentosa . . . 15
  - rufa 13
- Hymenophyllum tunbridgense v
- Lastrea calcarea . . . 87
  - dryopteris . . . 83
  - phegopteris . . . 91
  - poitsei . . . 81
  - robertiana . . . 87
- Leptogramma loweii . . 29
  - villosa 27
- Lomaria spicant . . . 19
- Lonchopteris mantelli . . vii
- Marginaria catherinæ . . 131
  - ceteracina . . . 139
  - dimorpha . . . 141
  - ensifolia . . . 141
  - incana . . . 139
  - minima 139
  - piloselloides . . 97
  - rufula . . . 101
  - serpens . . . 121
  - vaccinifolia . . . 121
- Nephrodium dryopteris . 87
  - lanosum . . . 45
- Neurogramma rufa . . 13
  - tomentosa . . . 15
- Neurogramme rufa . . 13

PAGE.

- Neurogramme tomentosa . 15
- Neuropteris loshii . . vii
- Niphobolus acrostichoides . 62
  - adnascens . . . 62
  - africanus . . . 62
  - albicans . . 62, 67
  - bicolor 62
  - carnosus . . . 62
  - caudatus . . . 62
  - chinensis . . . 67
  - costatus . . . 62
  - elongatus . . . 62
  - fissus 62
  - flocciger . . . 62
  - glaber . . . 62
  - hostatus . . . 62
  - lingua. *Sprengel* 62, 67, 68
  - neglectus . . . 62
  - nummulariæfolius . . 62
  - obovatus . . . 62
  - penangianus . . . 62
  - pertusus. *Sprengel* 62, 65
  - rotundifolius . . . 62
  - puberulus . . . 62
  - rupestris. *Sprengel* 62, 63, 65, 66
  - samarensis . . . 62
  - scytopteris . . 62
  - serpens 63
  - sinensis . . . 67
  - spissus 62
  - varius . . 62, 65
- Nothochlæna argentea. *Moore* 55, 56
  - crassifolia (lævis.) *Moore* 35, 36, 60
  - distans. *R. Brown* . 57
  - eckloniana. *Kunze* 47, 48
  - ferruginea . . . 37
  - gillesii 49
  - hookerii. *Lowe* . 33, 59
  - ilvensis 31
  - incana . . . 33
  - lanuginosa. *Desvaux* 43
  - lævis. *Martens* (see crassifolia) . . . 35, 60
  - marantæ. *R. Brown* 51, 52

PAGE.

- Nothochlæna nivea. *Desvaux* 33, 34, 36, 59
  - pumila 47
  - rufa. *Presl* . . 53, 54
  - sinuata . . . 37, 60
  - squamata . . . 49
  - squamosa. *Lowe* . . 49
  - tenera. *Hooker* . 39, 40
  - tomentosa. *J. Smith* 41, 42
  - trichomanoides. *R. Brown* 37, 38, 53, 60
  - vellea 43
  - vestita. *Desvaux* 31, 45, 46
- Notholæna lanuginosa . . 43
  - marantæ . . . 51
  - nivea 33
  - rufa 53
  - trichomanoides . . 37
- Notochlæna marantæ . . 51
- Odontopteris minor . . . vii
- Osmunda leptophylla . . 17
- Pecopteris adiantoides . . vii
- Phegopteris calcarea . . 87
  - dryopteris . . . 83
  - effusa 73
  - hexagonoptera . . 141
  - polypodioides . . 91
- Phlebodium myrtillifolium . 145
  - squamulosum . . 145
  - venosum . . 105, 106
- Phymatodes billardieri . . 137
  - fortuni 127
  - irioides . . . 125
  - sessilis 125
  - vulgaris . . . 77
- Pleopeltis pinnatifida . . 139
  - stigmatica . . . 105
  - venosa 105
- Polipodium dryopteris . . 83
  - vulgare 111
- Polypodium albidum . . 139
  - albo-punctatum. *Raddi* 107
  - alpestre. *Koch* 72, 115, 116
    - var. flexile . . 116
    - var. lanceum . . 116
    - var. tripinnatum . 117

PAGE.

- Polypodium alternifolium . 75
  - angustifolium. *Kunze* 129, 141
  - asplenioides. *Swartz* 103
  - attenuatum . . . 70
  - bifidum . . . 114
  - billardieri. *R. Brown* 137
  - bulbosum . . . 133
  - buxifolium . . . 121
  - cajanense . . . 97
  - calcareum . 72, 84, 87, 88
  - cambricum . . 111, 114
  - canariensis . . 111, 114
  - capillare 123
  - catharinæ. *Langsdorff and Fischer* . . . 131
  - ceteraccinum . . . 139
  - ciliatum 97
  - compositum . . . 103
  - connectile . . . 91
  - crenatum. *Kunze* . 81, 82
  - cruciatum . . . 143
  - ctenopteris vulgare . 111
  - deflexum. *Kaulfuss* 133, 134
  - dimorphum . . . 141
  - distans . . 95, 133
  - diversifolium. *Lowe* 93, 129
  - dryopteris. *Linnæus* . 72, 83, 84, 87, 88, 89, 143
  - effusum. *Swartz* 73, 74, 111
  - ensifolium . . . 141
  - fortuni. *Lowe* . . 127
  - fraxinifolium. *Jacquin* 95, 96
  - freyreisii . . . 95
  - glaucum . . . 131
  - grandidens. *Kunze* . 119
  - grossum . . . 75, 77
  - hænkeanum . . . 105
  - henchmanii. *J. Smith* 93, 94
  - hexagonopterum. *Michaux* 72, 143
  - hibernicum . . . 112
  - hirsutissimum . . 101
  - incanum. *Kunze* 139, 140
  - intermedium . . . 111
  - ireoides . . . 125
  - iridioides . . . 125

PAGE.
Polypodium irioides. *Poiret* 125, 126
  irregulare . . . 70
  juglandifolium . . 70
  karwinskianum . . 111
  lachnopodium. *J. Smith* 99
  lagopodioides . . 121, 122
  latebrosum . . . 91
  lepidopteris . . . 101
  leptophyllum . . 17
  leuceanum 70
  lingua . . . 67
  longipes. *Kunze* 75, 76
  lycopodioides . . . 122
  macrodon . . . 70
  megalodus . . . 81
  otites 123
  paradisæ . . . 123
  pectinatum . . . 123
  pertusum . . . 65
  phegopteris. *Linnæus* 19, 72, 91
  phyllitidis. *Linnæus* 79, 80
  phymatodes. *Linnæus* 97, 137
  piloselloides. *Linnæus* 97, 98, 121
  platybasis . . . 125
  pleopeltifolium . . 77
  plumosum . . 123, 124
  plumula. *Humboldt and Bonpland* 123, 124
  polycephalum . . 125
  polystichum . . 95
  proliferum . . . 95
  pteroides . . . 70
  pulchellum . . . 83
  reptans . . . 103
  rhæticum . . . 115
  robertianum. *Kunze* 84, 87, 88, 143
  rufulum . . . 101
  rupestris . . . 63
  scandens . . . 137
  scolopendria . . . 77
  semilacerum . 112, 114
  sepultum. *Kaulfuss* . 101
  serratum . . . 114

PAGE.
Polypodium smithianum . . 135
  splendida . . . 73
  squamulosa . . . 145
  squamulosum. *Kunze* 145, 146
  stigmaticum . . . 105
  struthionis . . . 123
  subauriculatum. *Blume* 109
  subtetragonum . . 135
  taxifolium . . . 123
  tectum . . . 97
  tetragonum. *Swartz* 135
  vaccinifolium. *Landsdorff & Fischer* 97, 121, 122
  velatum 139
  venosum. *Lowe* 105, 146
  venustum . . . 123
  virginianum . 111, 114
  viterbiense . . . 111
  viviparum . . . 95
  vulgare. *Linnæus* 72, 111, 112, 114
  var. acutum . . 113
  var. auritum . . . 113
  var. bifidum . . 113
  var. cambricum 112, 113, 114
  var. crenatum . . 113
  var. denticulatum . . 113
  var. hibernicum . . 112
  var. interruptum . . 113
  var. laciniatum . . 113
  var. marginatum . . 113
  var. multifidum . . 113
  var. ovatum . . . 113
  var. ramosum . . 113
  var. semilacerum . 112, 113
  var. serratum . 112, 113
  var. serrulatum . . 113
  var. sinuatum . 112, 113
  var. truncatum . . 113
Polystichum dryopteris . 83
  phegopteris . . . 91
Pseudathyrium alpestre . 115
  flexile . . . 115, 116
Pteris nivea 33
  rufa 13
  trichomanoides . . 87

PAGE.
Scolopendrium vulgare . 80, 125
Sphenopteris crenata . . vii
Struthiopteris germanica . . 19

PAGE.
Tæniopteris vittata . . vii
Woodsia ilvensis . . . 45
vestita . . . 45

AUTHORITIES QUOTED IN VOL. I.

Aiton.
Allchin, Dr.
Arnott.
Babington.
Bauer.
Bernhardi.
Blume.
Boccone.
Bolton.
Bonpland.
Bory.
Braun.
Brown, R.
Burmann.
Cameron.
Cavanilles.
Chamisso.
Cosent.
Croall.
Cunningham, Allen.
Deakin.
De Candolle.
Desfontains.
Deslongchamps.
Desvaux.
Dryander.
Endlicher.
Fee.
Fischer.
Forster.
Francis.
Fries.
Galleotti.
Gaudichaud.
Gillies.
Gmelin.
Godet.
Greville.
Guenzius.
Gray, A.
Hedwig.
Henderson, J.
Henfrey.
Heward.
Hoffmann.
Hooker, Sir W. J.
Hooker, Dr. J.
Hoppe.
Houlston.
Hudson.
Humboldt.
Jacquin.
Kaulfuss.
Koch.
Kunze.
Labillardiere.
Lagasca.
Lamarck.
Langsdorff.
La Peyrouse.
Ledebour.
Lindley.
Lindsey.
Link.
Linnæus.
L' Herminier.
Lightfoot.
Loddiges.
Loiseleur.
Loudon.
Lowe, Rev.
Lowe, E. J.
Martens.
Mackay.
Meyer.
Michaux.
Mirbel.
Mohr.
Morison.
Moore, Thomas.
Newman.
Nuttall.
Pallas.
Petiver.
Plukenet.
Plumier.
Poiret.
Pratt.
Presl.
Purdie.
Pursh.
Raddi.
Reinwardt.
R. de Vriese.
Riley.
Roem.
Roth.
Roxburgh.
Rylands.
Sadler.
Salisbury.
Schkuhr.
Schlechtendal.
Schott.
Sieber.
Sloan.
Smith, E.
Smith, J.
Sowerby.
Sprengel.
Sturm.
Suensk.
Suminski.
Swartz.
Thunberg.
Tusch.
Wallich.
Watson.
Weber.
Westcombe.
Wilson.
Willdenow.
Withering.
Wood.

CONTRIBUTORS TO VOL. I.

The Author begs to express his thanks to the following individuals, who have kindly supplied plants and fronds for illustration:—

Mr. W. Allen, Nottingham.
Mr. Atkins, Painswick.
Mr. Backhouse, York.
Messrs. Bass and Brown, Sudbury, Suffolk.
Messrs. Booth and Son, Hamburg.
Mr. Booker, Matlock.
Mr. Clarke, Royal Botanic Gardens, Glasgow.
Mr. E. Cooling, Derby.
Mrs. Delves, Tunbridge Wells.
Mr. Dryden, Allestre Hall, Derby.
Mr. R. J. Gray, St. Thomas', Exeter.
Mr. Hathorn, Wollaton Hall, Notts.
Messrs. A. Henderson, Pine-apple Place, London.
Messrs. E. G. Henderson, St. John's Wood, London.
Mr. J. Henderson, Wentworth House.
Sir W. J. Hooker, F.R.S., Royal Gardens, Kew.
Dr. J. D. Hooker, F.R.S., Royal Gardens, Kew.
Mr. Ingram, Royal Gardens, Windsor.
Mr. Ingram, Belvoir Castle.
Mr. Ingram, Belton.
Messrs. Kennedy, Covent Garden.
Miss Kingston, Colwick.
Mr. Jackson, Keddleston Gardens.
Mr. Lamb, Osmaston, near Ashbourn.
Captain A. S. H. Lowe, Highfield House.
Mr. G. Lawson, Edinburgh.
Dr. Mackay.
Mr. Mc'Intosh, Botanic Gardens, Madeira.
Rev. W. Miller.
Mr. R. T. Millett, Penzance.
Mr. T. Moore, F.L.S., Chelsea Botanic Gardens.
Sir Oswald Mosley, Bart., Rolleston Hall.
Mr. G. Norman, Hull.
Messrs. Osborn and Sons, Fulham.
Messrs. Parker, Holloway.
Messrs. J. Pearson, Chilwell, Notts.
Mrs. Riley, Papplewick, Notts.
Messrs. Rollisson, Tooting, near London.
Mr. J. Smith, Royal Gardens, Kew.
Mr. J. Sidebotham, Manchester.
Mr. Sim, Foot's Cray, Kent.
Mr. Stratton, Botanic Gardens, Cambridge.
Messrs. Veitch, Exeter.
Messrs. Veitch, Jun., Chelsea.
Mr. R. Wakefield, London.
Mr. W. Winstanley, Chaigeley Manor, Lancashire.
Mr. G. B. Wollaston, Chisselhurst, Kent.
Mr. Wraight, Newlands, Kent.